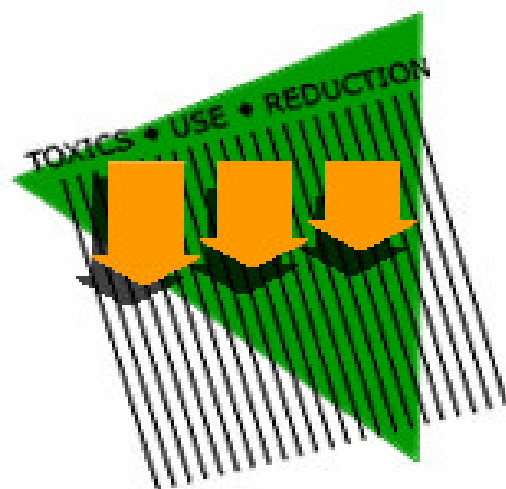


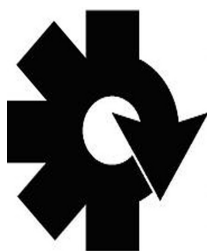
ENVIRONMENTAL MANAGEMENT SYSTEMS:

Guidance for Massachusetts Facilities

Toxics Use Reduction Act Program



July 2006



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TURA Program EMS Guidance Document

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1. INTRODUCTION

1.1. WHY THIS DOCUMENT?

The Commonwealth of Massachusetts encourages Massachusetts industries and public agencies to improve environmental performance and to protect the health and safety of their workers and communities. The Commonwealth also has a tradition of recognizing the value of planning and implementing management systems to achieve these goals. In 1989 the Massachusetts legislature promulgated the Toxics Use Reduction Act (TURA), which requires certain facilities to identify those activities and processes that use listed toxic chemicals, then develop and implement technically and economically feasible plans to minimize or eliminate their use and/or waste. Since its passage, TURA has been effective in significantly reducing the overall amount of toxic chemicals used, as well as the wastes generated, in the Commonwealth.

This document provides guidance for an organization that has not yet developed an EMS or wants to improve its EMS.

The Massachusetts TURA program recognizes that traditional TURA planning activities have provided companies with the basis for an environmental management system. By implementing an EMS, an organization will be able to build on the systematic planning of TURA to achieve continuous improvement in other areas, such as water and energy use. In addition, companies with an EMS will be better positioned to take advantage of government programs and policies that seek to provide recognition and rewards for improved environmental compliance and performance.

This document is designed for use by any Massachusetts organization interested in developing an EMS. The framework presented is a combination of the best elements of various EMS frameworks (as described in Chapter 4), based on the review of the collaborating agencies.

The Massachusetts TURA program has three agencies working together to assist Massachusetts companies in protecting the environment and the health of their workers and communities while maintaining their competitive advantage. The Toxics Use Reduction Institute (TURI) provides education and training on best practices in toxics use reduction planning, and promotes research and diffusion of innovative technologies that facilitate the reduction in toxic chemical use by Massachusetts industries. The Office of Technical Assistance (OTA) is a non-regulatory branch of the Executive Office of Environmental Affairs (EOEA) that helps manufacturers and industrial facilities, municipalities, schools and hospitals, households and others reduce or eliminate their use of toxics and generation of hazardous byproducts. The Department of Environmental Protection (MassDEP) administers the TURA reporting and planning requirements, and conducts compliance inspections that assist Massachusetts industry in identifying areas for improvement.

The Toxics Use Reduction Institute (TURI) facilitates a Peer Mentoring Workgroup program designed to help companies implement and improve their EMS. Over 50 companies participated in this program in the first 5 years. Host facilities included:

- | | |
|----------------------|-------------------------------|
| • Solutia (2005) | • Gentex Optics (2002) |
| • Millipore (2004) | • Nypro Clinton (2001) |
| • Intellicoat (2003) | • M/A-COM (2001) |
| • Sippican (2003) | • Allegro Microsystems (2000) |
| • Teradyne (2002) | • Process Engineering (2000) |

1.2. WHAT IS AN EMS?

An EMS is a management system that effectively integrates environmental considerations into an organization's day-to-day operations and management culture. The structure of an EMS may vary, though the most common is the ISO 14001 standard because it offers the opportunity to become certified. While voluntary, ISO 14001 certification is an effective and widely recognized method for demonstrating an organization's commitment to environmental performance and quality management, which can make it a valuable marketing and contracting tool for many businesses. In some cases, certification is necessary in order for an organization to compete in the global marketplace. An EMS may be developed for the whole facility, or it may be confined to a specific process or area of an organization. The term "fenceline" refers to the boundary that an organization sets for its EMS, i.e. the operations and activities that will be addressed in its EMS.

1.2.1 Benefits of an EMS

The EMS structure recognizes that environmental and economic performance are directly linked. Many of the economic and environmental benefits from implementing an EMS are derived from the proactive approach of pollution prevention. Pollution prevention (i.e. source reduction) strategies help reduce or eliminate environmental concerns at the source, resulting in less waste, more efficient use of inputs, reduced risk and liability that may be reflected in lower insurance premiums and avoided contingency expenses, and many other environmental, health, safety, and financial benefits. It also enhances the organization's public image internationally and locally, leads to the reduction of a company's bottom line, eliminates trade barriers, and creates a greater awareness of the environmental performance within the organization across all departments, which can help improve overall management planning and promote cooperation.

Organizations that report and plan under the Massachusetts Toxics Use Reduction Act (TURA) have practiced many of the elements of an EMS through the TURA Planning process. The success of the TURA program can be seen in the achievements of the companies implementing TUR practices identified in the planning stage. From 1990 to 2002, adjusted for a 22% increase in production, core TURA filers have decreased their toxic chemical use by 45% and reduced toxic byproducts by 69%. This guidance manual integrates the successful elements of TUR planning into the planning and aspects identification elements of an EMS (Section 3.2) and also into the implementation element under operations and control (Section 3.3.2)

Companies that have management systems in place as part of the ISO 9001 quality standards also have some components of an EMS. An EMS offers the opportunity for these facilities to integrate their chemical and product quality management and planning efforts, so that the focus is not just on hazardous chemicals or waste, but on the prudent use of all materials and resources by the organization.

1.2.2 Key Elements of an EMS

A properly designed EMS should follow the "Plan-Implement (Do)-Check-Review (Act)" cycle that is based on the principle of continuous improvement.

1. Environmental Policy

An organization's environmental policy serves as the basis for EMS design and implementation. It sets out the organization's goals and defines the actions the organization will follow. Environmental policies should be well documented and demonstrate a commitment to compliance, pollution prevention, and the well being of employees, customers, and the local community. The policy must be approved by top management and communicated to all employees, since they will play an integral role in meeting the goals of the policy.

KEY ELEMENTS OF AN EMS

- Environmental Policy
- Planning
- Implementation and Operation
- Checking and Corrective Action
- Management Review
- Continual Improvement

2. Planning

Careful planning allows the organization to proceed with implementation of an EMS in a logical, orderly manner. Planning should include comprehensive analysis of an organization's operations and the inherent environmental aspects and related impacts that may be controlled and for which an influence can be achieved, as well as consideration of the steps necessary to meet new goals. As part of the EMS planning phase, an organization must consider its environmental aspects and impacts, legal requirements, internal performance criteria, environmental objectives and targets and environmental plans and management programs. While development of an Environmental Policy falls under the planning phase, it is usually recommended that it be developed as a first step with the goal of setting forth a vision statement that has top management endorsement.

3. Implementation and Operation

Implementation of an EMS will likely require new priorities and practices and across-the-board training and other forms of support to universal understanding of the EMS process among staff. Documented procedures help establish and maintain momentum towards the organization's environmental and economic performance goals. To successfully meet the intent of this key EMS requirement, the following factors should be considered in the implementation and operation phase of the cycle: resources; EMS alignment and integration within the organization's overall business model, accountability and responsibility (e.g., roles and responsibilities), environmental awareness, knowledge skills and training, communications and reporting, EMS documentation, operational controls, and emergency preparedness and response.

4. Checking and Corrective Action

A successful EMS uses various methods to monitor and improve on its performance. Auditing, monitoring, and measurement of environmental indicators are necessary to achieve the goals and objectives of the EMS as defined in the Environmental Policy. They also provide opportunities to create performance incentives for all levels of staff. An organization has the ability to meet this specific requirement via consideration of the following: measuring and monitoring data associated with daily performance, corrective and preventive action, EMS records and information management and results of EMS audits.

5. Management Review

Management review ensures continuing suitability, adequacy, and effectiveness of the organization's operations and practices. The development, implementation, and maintenance of a successful EMS must be strongly supported by an organization's top management. Top management review strengthens the awareness and commitment to the EMS goals; it also assigns decisions regarding staff responsibilities and performance evaluation to the highest level of authority. To emphasize this key element, the first requirement of the official ISO 14001¹ guidelines stipulates that the organization's environmental policy (the centerpiece of an EMS) be developed by senior management.

6. Continual Improvement

It is critical to the success of an EMS to consistently look for opportunities to improve how your facility operates, and use the key elements of an EMS to realize them. Performance reviews, audits and corrective actions can help guide this process. Improvements should emphasize preventive actions.

1.3. MAKING THE BUSINESS CASE

Organizations invest in a systematic approach to managing their environmental performance for business reasons that are external and internal to their operations. The most commonly identified external motivation for companies to adopt an EMS is regulatory compliance. An EMS moves companies beyond current regulations by providing a way to get ahead of the curve, anticipate new environmental issues, and decide proactively how to plan for them.

Other equally important external motivators include market forces (pressures from domestic and international customers), availability of public/private technical support and assistance, and requirements of organizations' parent companies.

Anticipated cost savings represent an internal motivation to implement an EMS. Attention to environmental issues results in reduction of energy, water and materials usage and increased production efficiency.

Changing an organization's culture to its improve management capability is another important internal reason for adopting an EMS. Integrating an EMS into a company's business systems means that more staff have a role in environmental issues. As these roles are identified within a coherent system, described with a fresh and logical approach, and skills are improved to address them, a

THE BUSINESS CASE FOR IMPLEMENTING AN EMS – ONE COMPANY'S OBSERVATIONS

As a result of implementing an EMS, one Massachusetts company observed several tangible benefits, including:

- Stronger relationship between the facility and its French parent company, which increasingly views this plant as an environmental leader;
- Better control over chemical handling;
- Increased employee awareness of their potential impacts on the environment and the EMS itself; and
- Improved safety within the plant as a result of more effective procedures.

¹ ISO 14001:1996, Environmental management systems – Specification with guidance for use. Reference Number ISO 14001:1996(E)

company has an opportunity to tap into and realign employee enthusiasm for work, thereby improving company performance.

In Massachusetts, organizations have several services and incentive programs available at no charge that may be used to develop an effective EMS. Appendix A contains descriptions of these resources to help facilities realize tangible savings from effective implementation of an EMS. Business areas that can be boosted through the EMS process and the resources included in Appendix A include:

- Process efficiency, product development, and production output. A thorough review of where, how much, and why chemicals, water, energy, and labor are used (or wasted) in a process often leads facilities to find strategies to use these resources more efficiently. Understanding how chemicals and processes are regulated can help facilities plan for new product development and new production processes more strategically.
- Relationships with lenders and insurers. Banks and insurance companies assess their investment in a facility (a loan or insurance policy) in terms of the risks the facility poses. The “risks”, both environmental and occupational, can usually be linked to the chemicals and processes used on site and how they are prevented or controlled.
- Relationships with regulators. Both the federal and state governments have resources available to help you understand how your processes are regulated. Work proactively with the Department of Environmental Protection (MassDEP), the Occupational Safety and Health Administration (OSHA), and the Environmental Protection Agency (EPA) to identify your facility’s specific compliance responsibilities and avoid late fees, penalties, or even serious enforcement actions.

***ACCESS EMS RESOURCES
AND PUBLICATIONS TO:***

- Identify opportunities for improved process efficiency
- Take advantage of incentives through banking and insurance institutions
- Improve relationships with regulators

1.4. COMPLIANCE AND BEYOND

Implementing an effective EMS can help your facility maintain and improve compliance. In fact, this is one of the most commonly mentioned reasons for seeking to develop a site-specific EMS. MassDEP believes that implementation of an effective EMS can improve an organization’s environmental performance, and therefore encourages any organization seeking to develop an EMS. MassDEP expects that a facility seriously committed to compliance will make every effort to stay up-to-date on and comply with all applicable federal, State and local regulations and policies. MassDEP stresses the importance of integrating the key elements of an EMS into an organization’s overall decision-making and planning, and in particular, decisions on capital improvements, product and process design, training programs, and maintenance activities (see Appendix B for MassDEP’s Policy on EMS in Enforcement Settlements) in order to improve environmental compliance.

Once an EMS has been fully implemented, and is well established in an organization, continual improvement naturally moves companies toward goals that reach past just complying with the regulations. Examples of these “higher” level goals might include increased resource use efficiency,

minimized impact on local ecologies, enhanced relationships with local communities and community organizations, etc.

2. GETTING STARTED: OVERVIEW OF THE ENVIRONMENTAL MANAGEMENT SYSTEM

Throughout this document, you will learn the methods and techniques recommended for developing and implementing an effective EMS. To begin, take the following actions:

- State your goals for having an EMS. This might include a project mission statement that can be incorporated into your environmental policy (refer to Section 3.1). This statement conveys what you hope to achieve through implementation of an EMS.
- Develop an estimated budget and schedule, and obtain the support and commitment of upper management to proceed with the project of developing an EMS (refer to Section 3.1 and 3.5). Determine whether the services of an outside contractor will be needed (refer to Section 6, “Using Outside Services”) and whether the organization will pursue certification. Both of these items will affect the budget that is established for the EMS effort.
- Identify a champion within your organization who will take primary responsibility for leading the EMS development process, at least initially (refer to Section 3.2 as well as “EMS Teams” below). Identify a core team to work with the champion.
- Conduct a gap analysis to gain a better understanding of the magnitude of the project. A gap analysis is an evaluation of the policies, procedures, training programs, and records that the organization has in place versus what is needed in order to fulfill the requirements of a chosen EMS framework.
- Develop a plan to monitor and communicate the results of the EMS status both internally and externally.

GETTING STARTED:

- Identify Your EMS Goals
- Develop a Budget and Schedule
- Identify a Champion
- Conduct a Gap Analysis
- Develop a Communication Plan

2.1. MANAGEMENT COMMITMENT

It is widely recognized that for an EMS to succeed, a **strong and consistent commitment** from top management is required.

It is widely recognized that for an environmental management system to succeed, a strong and consistent commitment from top management is required. Strong management support helps encourage all staff to share ownership in the success of the EMS, as well. When initiating the EMS planning process, the commitment of management to participate in and support the implementation team’s activities is critical. Top management personnel must provide leadership in the initiation of the process and make a clear statement of support to those involved in the development and management of the EMS. This support will need to include the commitment to allocate resources as necessary to achieve the goals of the EMS. Middle management personnel will likely need to be involved either on the EMS implementation team or in support of their staff who are on the team, to ensure consistent representation and engagement in the process.

The level of commitment of management will be reflected in the scope of the EMS, its ability to address site-specific issues, and the continual improvement of the system itself. Management commitment issues are addressed in more depth elsewhere in this document (see Sections 3.1 and 3.5 respectively on Environmental Policy and Management Review. Excellent guidance is also provided in Section 4.2, Environmental Policy, of the ISO 14001:1996(E) reference).

2.2. EMS TEAMS

Implementation of an EMS may involve some shift in the organization's management culture, priorities, and procedures. The experience of organizations developing EMSs (as well as TUR plans) has generally been that the makeup and level of commitment of the EMS Team is critical to developing a system that achieves the facility's environmental and worker health and safety goals and continually improves performance. This team should include personnel from a variety of areas throughout the organization, including management, human resources, production (including operators), product design, quality, environmental health and safety, purchasing, engineering, maintenance, research, etc.

A critical team member is the EMS Team Coordinator. The roles, responsibilities and authorities of this position need to be clearly defined. The characteristics of the EMS Team Coordinator are that of "champion" and management representative. A champion is a person (or persons) who can oversee program implementation, communicate the results to management, and provide effective team leadership. The EMS Team Coordinator's ability to have access to and communicate with upper management is important. Not only will this person be responsible for conveying the information gained through the implementation of the EMS, but will also be responsible for securing appropriate resources required to fully implement the elements of the EMS. The EMS Coordinator may also provide the EMS team with instruction on the principles of the EMS structure and training as needed. With the team, the EMS Coordinator should also be responsible for developing a preliminary action plan detailing the steps necessary for establishing an EMS. This plan should identify the necessary procedures, specify activities needed to address existing issues, target and prioritize issues, and identify steps necessary to prevent potential issues.

COMPOSITION OF AN EMS TEAM

Consider personnel from a variety of areas throughout the organization, including:

- Management
- Human resources
- Production (including operators)
- Product design
- Quality
- Environmental health and safety
- Purchasing
- Engineering
- Maintenance
- Research

Consider incorporating your EMS Oversight Team into an existing Quality or Safety Team

After the EMS is implemented, an EMS Oversight Team or Committee must be identified to guide the day-to-day operation of the EMS. This typically involves, for example, administering the internal audit program, approving corrective actions, tracking progress on objectives, reviewing and updating documents, and reporting results and recommendations for continual improvement to management review. Typically, this team or committee will consist of some of the same participants that served on the Implementation Team. Recognize that existing committees (quality, safety, etc.) can be efficiently used to carry out these EMS functions; it is also

likely they may already do so. For this reason, it is important to include this representation on the EMS Team. It is generally understood within the field of management systems that the EMS Team Coordinator should remain fixed for at least the first several years in order to assure continuity, encourage learning and maximize continual improvement within the system. However, other team members may be added or rotated over time.

2.2.1 About the Gap Analysis

Once your organization has made a commitment to developing and implementing an EMS and has assembled the EMS Team, the next critical step is to conduct a gap analysis. At the outset of the EMS process, organizations often do not realize that they already have many components of an EMS or perhaps these components are not documented. The gap analysis is a critical first step because it creates a baseline that informs the planning process by telling you what you already have versus what you need to develop. A gap analysis is a series of questions designed to identify whether the facility has:

- A guiding environmental policy that is supported by management;
- Secured resources necessary to implement and maintain an EMS; and
- Systems in place that address, among other things:
 - ❑ maintaining currency on laws and standards that may be applicable to the facility,
 - ❑ identification of impacts to the environment and procedures for controlling them,
 - ❑ performance goals and performance measures for the EMS,
 - ❑ worker education and training needs relative to the EMS and their job functions,
 - ❑ communication programs for those within the facility as well as outside parties,
 - ❑ record keeping and control of documents,
 - ❑ emergency procedures,
 - ❑ actions to correct deficiencies (compliance and system-wide) and prevent their recurrence,
 - ❑ management review of the overall EMS, and
 - ❑ a mechanism for making improvements and holding staff accountable for the EMS.

The answers to these questions (and more included in the gap analysis) are usually not strict “yes” or “no” answers. For example, a facility may conduct training, but perhaps records are not kept or the training may be reserved for the most hazardous jobs at the facility. For this reason, a point system may be assigned where for any given question a facility may score between the minimum and maximum. By graphing out these results – typically against the “ideal” facility for that industry type and size, a process called benchmarking – your facility can then gain a sense of the work that lies ahead in developing the EMS.

Depending on the EMS expertise of the staff within your organization, you may choose to have someone from within the organization perform a gap analysis, or you may elect to hire a consultant/contractor for this task.

2.2.2 How Much of an EMS Already Exists? The EMS in a Nutshell

At this point, the question becomes: “What does an EMS cover?” Each of the critical elements described is made of up various activities organizations should, and probably do, have in place to some degree. Table 1 provides a quick reference list of what the typical EMS covers.

In addition, this Guidance Document recommends that an EMS include:

- Independent audits to assess compliance and the health of your EMS. These independent audits serve to identify any deficiencies in a timely fashion. “Independent” means the audit is conducted by someone not directly involved with or responsible for the operations being audited; bringing in an experienced auditor from a sister or parent company may meet this condition;
- A system for accessing information. The success of an EMS is based on employees knowing, understanding, and practicing procedures and techniques that reduce environmental and worker health and safety risks. To accomplish this, you need to be able to find the information (e.g. regulations and best management practices) necessary and to identify continuous improvement efforts appropriate to your facility;
- Acknowledgement within the EMS system that **source reduction and efficient management of resources** (energy, water, chemical usage, etc.) are priority activities in the EMS; and
- A process that allows the EMS to sustain itself independent of staff, management, product, or process changes. Some facilities know this process as “Management of Change.”

These items are covered in more detail in the remaining chapters and Appendices of this document.

Table 1. Key Elements of an EMS: A Snapshot ²

<ul style="list-style-type: none"> • Environmental policy — Develop a statement of your organization's commitment to the environment. Use this policy as a framework for planning and action. • Environmental aspects — Identify environmental attributes of your products, activities and services. Determine those that could have significant impacts on the environment. • Legal and other requirements — Identify and ensure access to relevant laws and regulations, as well as other requirements to which your organization adheres. • Objectives and targets — Establish environmental goals for your organization, in line with your policy, environmental impacts, the views of interested parties and other factors. • Environmental management program — Plan actions necessary to achieve your objectives and targets. • Structure and responsibility — Establish roles and responsibilities for environmental management and provide appropriate resources. • Training, awareness and competence — Ensure that your employees are trained and capable of carrying out their environmental responsibilities. • Communication — Establish processes for internal and external communications on environmental management issues. • EMS documentation — Maintain information on your EMS and related documents. • Document control — Ensure effective management of procedures and other system documents. • Operational control — Identify, plan and manage your operations and activities in line with your policy, objectives and targets. • Emergency preparedness and response — Identify potential emergencies and develop procedures for preventing and responding to them. • Monitoring and measurement — Monitor key activities and track performance. Conduct periodic assessments of compliance with legal requirements. • Nonconformance and corrective and preventive action — Identify and correct problems and prevent their recurrence. • Records — Maintain and manage records of EMS performance. • EMS audit — Periodically verify that your EMS is operating as intended. • Management review — Periodically review your EMS with an eye to continual improvement.
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² From Environmental Management Systems: An Implementation Guide for Small- and Medium-Sized Organizations. NSF International. 2001. p.15.

3. THE ENVIRONMENTAL MANAGEMENT SYSTEM

3.1. ENVIRONMENTAL POLICY

3.1.1 What Is a Good Environmental Policy?

Your company's environmental policy is a public statement that is defined by top management, reflects your organization's values and vision, and provides direction on how you intend to conduct your business in support of your EMS program. It is a visible demonstration of your commitment to operate according to the policy principles. Therefore, development and adoption of a clear Environmental Policy serves as a powerful way for top management to demonstrate support of and leadership in the EMS.

The policy should reflect your company's business operations, considering environmental aspects of all activities that provide products and services to your clients. Everyone in your company should understand the policy with respect to their assigned roles and responsibility within the organization. Your customers, suppliers, community and other interested parties should have access to it. Likewise, anyone reviewing your EMS should be able to easily read and understand your policy.

Most EMS frameworks suggest that a good policy will be specific enough to guide action (e.g., "Our products and processes will be designed to minimize the generation of waste and the use of toxic materials wherever possible. We will conserve natural resources and practice energy conservation at all levels of operation").

ADVANCED ENVIRONMENTAL POLICY COMMITMENTS

- Move toward sustainable business practices.
- Support the health and safety of workers.
- Open communication with the public on EMS performance.

BASIC ENVIRONMENTAL POLICY COMMITMENTS

- Comply with environmental regulations and standards.
- Use pollution prevention (source reduction) as the preferred means for meeting EMS goals.
- Continually improve the EMS.

In practical terms, a good policy can also provide flexibility for business needs (e.g., "We will achieve higher product yields by making more efficient use of raw materials and reducing water consumption").

Continual improvement is a logical goal for any business, and the EMS will create helpful structures and procedures for audit, review and correction. Specific wording in the policy regarding these management system tools strengthen your company's ability to use them effectively. (e.g., "We commit to enhancing our EMS through checking, corrective action, and annual review by top management").

3.1.2 Creating your Environmental Policy

You can use the Environmental Policy to frame your company's vision from a new perspective. This is an opportunity and a challenge, and with input and review by top management, can generate objective guidance and momentum for the EMS. Start by looking at policies that may already exist for your facility or for your corporation. These may have been developed internally or adopted from a trade or professional association. Examples of the latter are the American Chemistry

Council's "Responsible Care," or the stakeholder generated "Global Reporting Initiative." The new environmental policy can stand-alone or be integrated into existing business policies.

Input obtained from many departments and levels of the company provides the opportunity for broad participation, wider acceptance and interest, and may result in a better policy.

The policy should be about who you are and what you do. What are relevant environmental concerns for your particular operation and surroundings? Consider use of materials (raw materials, supplies, water, etc), energy and equipment that are used in operating your business (e.g., offices, production, shipping and transport, storage, contract services, etc.) This exercise may yield ideas for the environmental policy as well as help set priorities for environmental goals and objectives for the first cycle of your EMS.

Top management signs the final policy, and the document is controlled so that changes can only be made using the defined EMS document control process (refer to Section 3.3.8). You certainly may decide as an organization to change the policy based on periodic reviews. The review should be comprehensive and include top management.

KEY TERMS IN PLANNING

Aspect: An element of the organization's activities, products, or services that can interact with the environment or with health and safety of employees, visitors or neighbors.

Impact: Any change to the environment, health and safety of employees, visitors or neighbors, wholly or partly resulting from an organization's activities, products, or services. Can be positive or negative.

Objectives: Goals that your organization sets for its EMS. Can (should) be integrated with other business goals.

Targets: A measure of the EMS goal (objective) that your facility wants to reach. Usually connected with an end date (e.g. reduce hazardous waste by 50% by 2005).

Milestones: Checkpoints in the schedule you set for your EMS that help gauge if/how EMS objectives are being met.

Pace: Schedule that your organization sets for reaching EMS objectives and targets.

3.1.3 Communicating the Environmental Policy

The new Environmental Policy needs to be communicated to each of your employees, and understood through appropriate training that provides environmental guidance for their work. Some ways by which companies have made the policy easier to remember and understand are by using acronyms, logos and mascots, posters, mugs, T-shirts, and reminders on paychecks. Internal newsletters and other training events offer existing venues to introduce and explain your policy to your employees. Make sure your suppliers, customers and contractors are aware of and follow your policy.

The policy should also be available to the public. It can be posted in the front entry area of your facility or on your website, for example. Hopefully, the policy is one your company can use in marketing its products, and can be a part of promotional materials.

EXAMPLE POLICY:

Our Environmental Policy demonstrates our commitment to the protection and enhancement of the environment in which we all live. Core Elements of our Policy are:

Pollution Prevention: We are committed to conducting our operation in a manner that prevents pollution and conserves resources. This commitment supports our overall mission to create value for our local communities and our employees.

Continuous Improvement: We will strive for the continuous improvement of our environmental performance by reducing the impact of our environmental aspects and by improving our Environmental Management System itself.

Legal Compliance: We will work with government and non-government organizations, including suppliers, customers, and the local community to ensure compliance with all federal, state, and local community regulations.

Communication: This policy shall be communicated to all of our employees to help foster environmental responsibility. This policy is available to the public.

3.2. PLANNING

Planning involves identifying significant aspects and associated impacts, conducting a legal requirements analysis to ensure compliance with applicable regulations, setting targets and objectives, developing internal performance criteria and creating appropriate environmental plans and management programs to ensure systematic implementation of the targets and objectives. Companies experienced in TUR Planning can apply many of the same principals to EMS planning. Appendix C provides a matrix depicting the common elements between and ISO 14001 EMS and a TUR Plan.

3.2.1 Process Characterization and Process Flow Diagrams**WHAT IS A PROCESS FLOW DIAGRAM?**

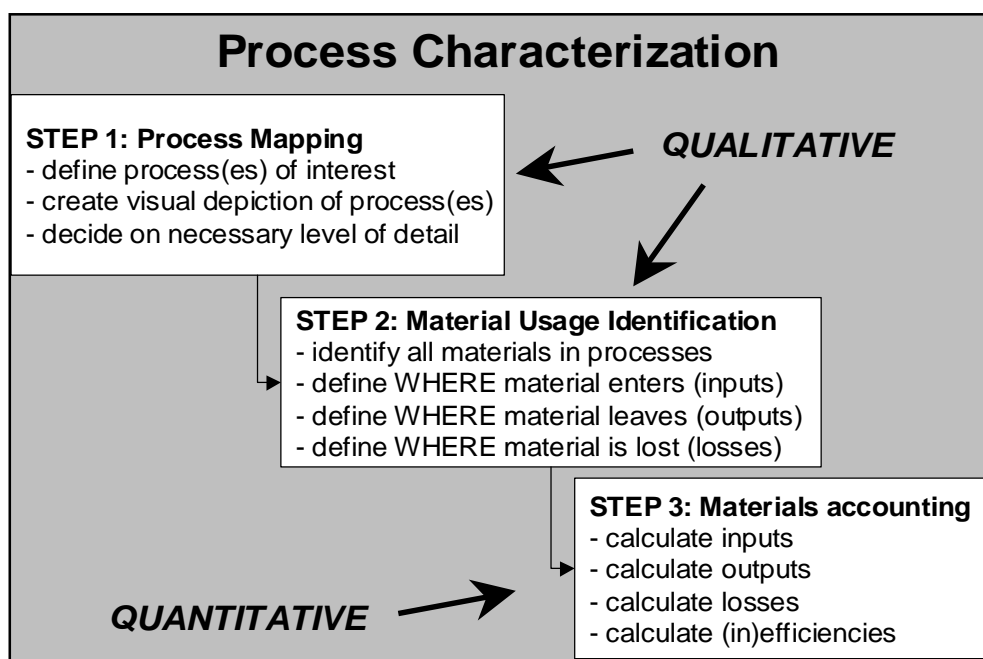
A process flow diagram (PFD) is a map of the activities in your facility that shows the chemicals and resources used at each step. PFDs for EMS planning generally show wastes along with inputs and outputs (products/services).

The EMS Implementation Team is the ideal core group for conducting the process characterization (including constructing the process flow diagrams) that allows you to gain perspective on the overall activities and individual processes conducted by your organization. Process Characterization is a description of your facility's activities in terms of materials (chemicals

and resources such as water and energy) used, products or services created, and wastes generated. It is a good technique to begin to understand where potential impacts to the environment lie.

Some Massachusetts facilities may already be familiar with the TUR planning guidance on Process Characterization and developing Process Flow Diagrams (PFDs). While the TUR guidance was originally developed for analyzing toxic chemical use in a facility, this structure can actually be used to evaluate any activity that has a potential environmental impact. Process Characterization allows the team to identify potential environmental impact(s), and begin to assess the overall significance of the aspect being evaluated.

Process Characterization involves three steps:



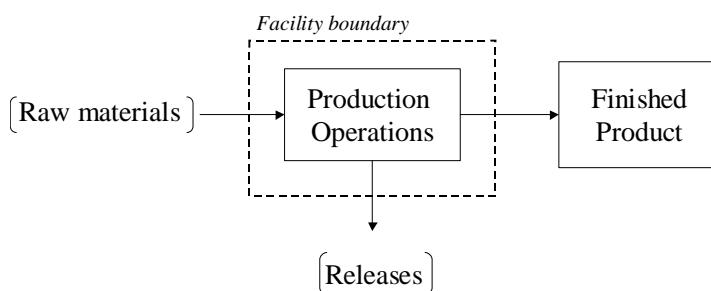
1. Process Flow Diagramming or Process Mapping;
2. Material Use Identification; and
3. Materials Accounting.

3.2.1.1 Process Flow Diagramming or Process Mapping

A process map is a visual representation of the movement of materials or resources through the facility. The format and level of detail provided in a process map depends on the complexity of the facility and the level of detail needed. It should represent all the steps through which raw materials or resources pass to form a product or conduct an activity, and may also include information such as energy, labor and emissions.

The simplest process flow diagram can be represented as shown:

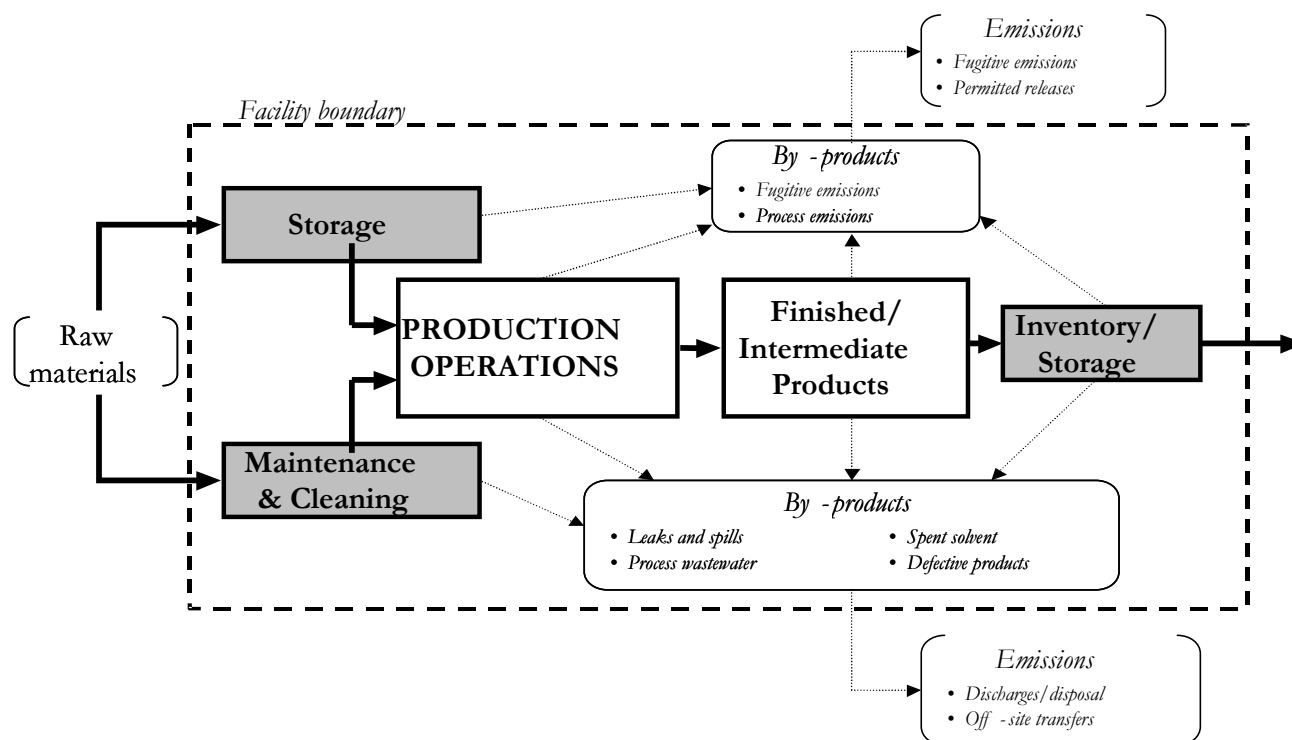
A simple process map can be useful in the early planning phase of EMS development, because it may be important at that time to deal only with the qualitative aspects of the process. In a very complex production facility, it is probably best to diagram the whole facility first using a simple qualitative diagram. Later you can go back and divide the facility into independent production processes and draw a separate, more comprehensive and detailed process flow diagram for each.



3.2.1.2 Materials Use Identification

Defining where materials or resources (e.g., water or energy) enter and leave the facility and/or the process can be important for setting targets.

A schematic of a more detailed process map may look like the following:



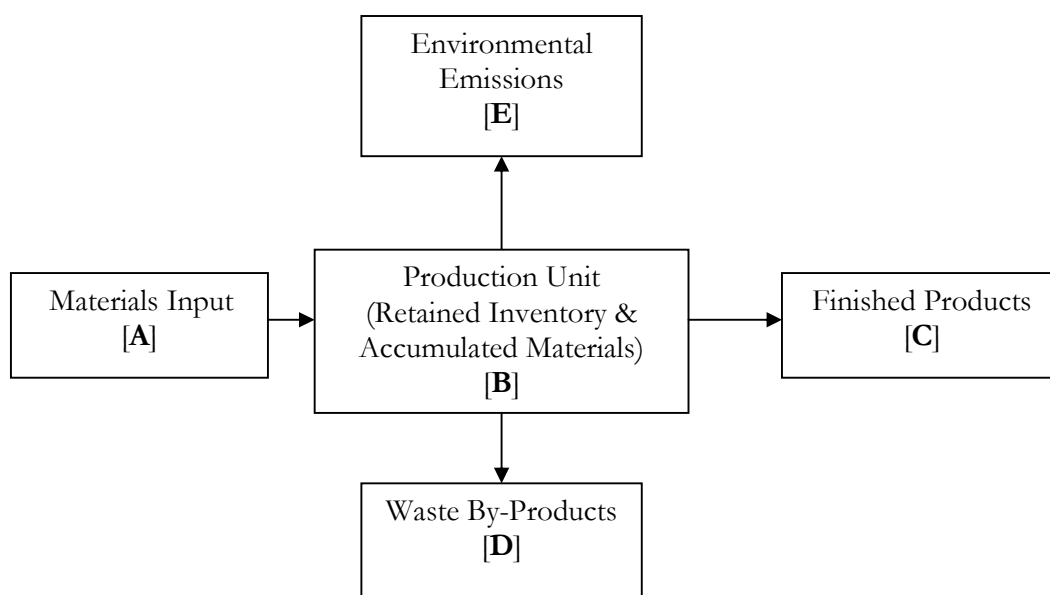
In this figure, the significant aspect may be the production process, which results in impacts on the air, water and land through emissions shown on the map.

3.2.1.3 *Materials Accounting*

The purpose of materials accounting is to present a complete and comprehensive picture of all of the materials (chemicals and resources) used in a process or facility. The mass balance concept is fundamental to materials accounting and is a technique already used in process engineering. Put simply, a mass balance equates the materials put into a process with the materials released by the same process:

$$\text{Materials In} = \text{Materials Out} + \text{Materials Accumulated}$$

or, $A = B + C + D + E$



To conduct a mass balance, all materials that pass into or out of the associated activity or process are identified and measured over a specified period of time. At the close of the time period the materials that remain accumulated inside that “envelope” are measured. Finally, the material input is equated against the materials output plus the accumulated materials that remain inside the envelope. Any discrepancy between inputs and outputs plus accumulation indicates unaccounted material flows or errors in measurements.

A mass balance always requires identifying some discrete unit of time. If a process is routine and unchanging day by day, then one single day may be sufficient. For many processes, there are changes due to contracts, production levels, or seasons. In such cases a fiscal year may be a better unit. The time unit selected should include the whole range of operations typically associated with the production unit.

Data for materials accounting can be gathered in the following ways:

- Direct measurement (including metering and monitoring)
- Business records inventories

- Mass balance
- By-product and emissions accounting
- Engineering calculations

3.2.2 Identifying Aspects and Impacts

Identifying and documenting environmental aspects and their impacts is one of the most critical steps in EMS process planning. It can be one of the most challenging – as well as one of the most rewarding. Decisions you make in this step can affect many other EMS planning system elements (such as identifying legal requirements, establishing internal performance criteria, and setting objectives and targets). Careful identification of aspects and their impacts will pay dividends in later steps, such as determining an appropriate set of goals and objectives for your organization.

If your organization has undertaken TUR planning or other related pollution prevention projects, you are familiar with the need to identify how and where a waste is generated and a chemical or resource is used. In this case, you probably already understand how to identify aspects and their impacts.

Generally speaking, aspects are activities your facility:

- Can control; and
- Over which it can have an influence.

Your organization is not expected to manage issues outside its sphere of influence or control. For example, while your organization probably has control over how much electricity it buys from a supplier, it likely does not control or influence the way in which that electricity is generated. Similarly, if your organization manufactures a product that is subsequently incorporated into another product (for example, a bumper that becomes part of an automobile), your organization does not control the environmental aspects of that “finished” product (the automobile). Thus, your focus should be on the environmental aspects of your activities, products or services.

WORKER HEALTH AND SAFETY IS AN ASPECT

Massachusetts has regulations such as the Right-to-Know law and the Toxics Use Reduction Act, which require organizations to consider the health and safety of its employees, as it relates to process chemical use.

The relationship between aspects and impacts is one of cause and effect. The term “aspects” is neutral, so keep in mind that your environmental aspects can be either positive (such as making a product out of recycled materials) or negative (such as discharging toxic materials to a stream). Aspects may result from past activities, such as spills, the improper disposal of chemicals in an unprotected landfill, or an improperly installed underground storage tank.

Once you have identified and documented the environmental aspects of your products, activities, and services, you should determine which aspects could have significant impacts on the environment including the health and safety of employees. Aspects that you determine to be significant should be considered when you establish environmental objectives and targets, define operational controls (or internal performance criteria), and consider other planning actions as you build your EMS.

The Team should define and document the criteria that will be used to determine significance. Such criteria often include the types of impact; the magnitude, frequency, and duration of the

impact; regulatory status; level of community concern; and other factors. A quantitative scale is typically defined to determine the level of significance for each selected criterion used. A qualitative system may also be used (e.g., low, medium, and high). Try to keep the impact evaluation process as simple as possible, yet sufficient enough to provide a reasonable evaluation of which impacts are significant.

Some Potential Environmental Aspect Categories:

- Toxic Chemical Use
- Air Emissions
- Solid and Hazardous Wastes
- Contamination of Land
- Local Issues
(e.g., noise, odor, dust, traffic, etc.)
- Product Development
- Water Discharges
- Energy Use
- Raw Material and Resource Use
(water, energy, etc.)
- Hazardous Material Storage and
Handling
- Worker Health and Safety

Facilities that have developed toxics use reduction (TUR) plans may already be familiar with the process of identifying aspects and impacts as it pertains to chemical use. The guidelines of facility planning (e.g., process characterization, process flow diagramming, materials accounting, and options identification, evaluation and implementation) used in TUR planning also apply to EMS.

The Office of Technical Assistance (OTA) on-site technical specialists can help you identify and evaluate your usage of toxic chemicals and suggest less toxic alternatives whenever possible.

Excellent tools and examples for determining aspects and impacts of an organization's operations, as well as for evaluating the significance of those aspects, are available. Specific resources include the *Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations* document prepared by NSF in cooperation with the US EPA, 2nd edition January 2001, as well as in the *General Environmental Management System Template*, prepared for the US EPA in April 2001. Other useful resources are identified in Appendix A.

3.2.3 Legal and Other Requirements

An EMS should recognize that maintaining compliance with all applicable legal requirements is essential to demonstrating a commitment to managing aspects of your organization's operations in such a way that potential impacts on the environment are minimized. To comply with the laws and regulations that apply to your organization, you must first determine what the rules are, and how

ADVANCED LEGAL AND OTHER REQUIREMENTS

Ideally, facilities should consider other elements that go beyond those of more commonly accepted EMS frameworks. These include:

- Consideration of worker health and safety as it relates to use of chemicals at the workplace;
- Clear emphasis on source reduction in achieving objectives; and
- Inclusion of toxic chemicals in aspects analysis.

they affect what you do. Compliance with legal requirements should be an essential goal of an acceptable EMS. Therefore, planning for an effective EMS should include processes to identify and communicate legal and other requirements, and ensure that these requirements and the results of the periodic evaluation of regulatory compliance are considered in the overall management review process.

TURA agencies recommend that companies include the following within their EMS:

- Environmental compliance policies, procedures and guidance documents for all of the organization's operations and activities;
- A system for tracking compliance activities.

These can be accomplished through the legal requirements planning process. See Appendix B for more information about MassDEP's Policy on EMS in Enforcement Settlements.

The term "other requirements" might include industry codes of practice, local ordinances, corporate policies or recommendations from environmental organizations that your organization feels are appropriate to comply with in keeping with its commitments.

Once applicable legal and other requirements have been identified and evaluated with respect to your organization's potential environmental aspects and impacts, procedures should be developed for communicating the requirements, and your plans for maintaining compliance with them, to employees, on-site contractors and others. Because legal and other requirements change over time as do your business processes, it is important that the EMS include a procedure for monitoring any new requirements and updating the EMS accordingly. A sample procedure for identifying legal and other requirements appears in Appendix D.

3.2.4 Setting Objectives and Targets

Once your Team has identified the significant aspects associated with its operations, the next critical step in the EMS planning phase is establishing an appropriate set of objectives to address the identified significant environmental impacts. Part of this process is establishing target dates and quantities that allow your organization to measure your progress towards achieving the objectives. Objectives and targets help your organization translate its mission (as stated in general terms in the environmental policy) into distinct actions. These environmental goals should be factored into your strategic planning process, and integrated into your organization's other business management processes.

In setting objectives for your organization, you should consider your environmental policy statement, significant aspects and impacts, applicable legal and other requirements, stakeholder concerns (including customers), and technological and economic feasibility of options. Setting objectives and targets should involve people in all of the relevant functional area(s). These people should be well positioned to establish, plan for, and achieve the selected objectives. In communicating

EXAMPLE:

OBJECTIVES and TARGETS

OBJECTIVE: Reduce volatile organic compound (VOC) emissions from paint.

TARGET: Achieve 80% reduction in VOCs by converting from solvent-based paint to water-based paint.

objectives to employees, try to link the objectives to the actual environmental improvements being sought.

Objectives should be consistent with your organization's overall mission and plan and should serve to support your established policy (e.g., pollution prevention, continual improvement, and compliance). Targets should be sufficiently clear to answer the question: "Did we achieve our objectives?" Objectives can be established to maintain current good levels of performance as well as to improve performance. For some environmental aspects you might have both maintenance and improvement objectives.

Organizations should develop a system for continuous improvement goals and reporting as part of their objectives and targets. Objectives may include:

- recycling and purchase of recycled products;
- pollution prevention;
- source reduction;
- resource conservation;
- energy consumption;
- waste minimization;
- renewable energy; and
- renewable technologies.

To obtain the views of interested parties, consider surveying employees for suggestions, holding an open house or establishing a citizen's advisory panel with people in the community. Clear communication with the various groups interested in the management of your organization's potential impacts on the environment (i.e., the stakeholders) at every stage of the planning process can help you to develop relationships that will promote the effective implementation of the EMS in the future. See Section 3.6 for guidance on identifying and working with stakeholders.

3.2.5 Environmental Management Programs (EMPs)

An effective and sustainable EMS requires that well-defined and documented plans for achieving environmental objectives and targets be developed. Specific procedures should be developed for each activity that is associated with a specific significant aspect. These procedures, commonly termed Environmental Management Programs or EMPs, help your organization assure compliance with legal requirements, implement technological options that have been identified to ensure operational control, and respond consistently to the views of interested parties. EMP documentation states the specific objective, the strategy for achieving the objective, associated targets and timing, staff responsibilities relative to those actions and specific steps. Related procedures, legal documents, training records, forms and other documents should be indicated on the EMP. It is also useful to identify any potential new developments or changes that would require that the EMP to be revised.

***THE EMP FOR A
SPECIFIC OBJECTIVE
DEFINES:***

- Objective
- Strategy to Achieve Objective
- Associated Targets and Timing
- Staff Responsibilities
- Specific Actions

3.3. IMPLEMENTATION

How effectively you implement elements of your EMS and operate your activities is critical in achieving the environmental performance set forth as goals of your EMS planning activities.

3.3.1 EMS Roles and Responsibilities

Your facility's EMS will only be effective if human, physical and financial resources have been committed to the effort and that these resources are distributed as efficiently as possible. It is important, therefore, to clearly define what the roles and responsibilities of all employees associated with the implementation of the EMS will be.

In order to accurately and appropriately identify EMS implementation roles and responsibilities for your facility, consider the following:

EXAMPLES OF TYPICAL EMS RESPONSIBILITIES

- Communicate the results of the EMS
- Coordinate auditing efforts
- Coordinate communications with interested parties
- Track/analyze new regulations (and maintain library)
- Train employees
- Obtain permits and develop compliance plans/prepare reports
- Integrate environmental aspects into operating procedures
- Integrate environmental responsibilities into performance appraisal process
- Monitor key processes
- Comply with applicable regulatory requirements
- Coordinate emergency response efforts
- Maintain EMS records (training, etc.)
- Identify environmental aspects of products, activities

- Review facility functions represented within the EMS Team and from elsewhere in your facility to determine who must have responsibilities within the EMS defined,
- Review the EMS tasks that need to be completed and assign responsibilities to these,
- Document EMS implementation roles and responsibilities in a table or other form, and
- Define and document EMS Roles and Responsibilities.

Implementation of the EMS is everyone's responsibility, and should NOT be considered just the role of the EH&S department.

Examples of staff expertise and EMS roles are shown in the following table:

Staff Function	Expertise Brought to EMS Team and Potential EMS Role
Facilities Engineering	<ul style="list-style-type: none"> • Environmental, health, safety aspects of construction and equipment installation.
Environmental Health & Safety	<ul style="list-style-type: none"> • System for complying with environmental, health and safety regulations. • Management of environmental, health, and safety records.
Human Resources	<ul style="list-style-type: none"> • Define competency requirements and job descriptions for various EMS roles. • Train temporary workers and contractors. • Maintain training records. • Integrate environmental management into performance evaluation.

Staff Function	Expertise Brought to EMS Team and Potential EMS Role
Plant Manager	<ul style="list-style-type: none"> Review results of audits Review Environmental Policy for currency and appropriateness
Process Supervisor	<ul style="list-style-type: none"> Monitor key operational controls Verify operator training status Identify and complete corrective and preventive actions as necessary

The process that your facility follows for assigning EMS roles and responsibilities should be documented. The EMS Roles and Responsibilities process should address:

- Who will develop the EMS roles and responsibilities;
- How the EMS roles and responsibilities will be documented;
- Who will communicate the EMS roles and responsibilities;
- Who will review and update the EMS roles and responsibilities;
- How often a review will occur; and
- What approvals will be required.

Finally, it is important to confirm that EMS Roles and Responsibilities are included in staff job descriptions.

TURA agencies recommend that organizations develop clear responsibilities and accountability for their staff and management, as well as on-site service providers and contractors to assure regulatory compliance, required reporting to regulatory agencies, and implementation of corrective actions. See Appendix B for more information about MassDEP's Policy on EMS in Enforcement Settlements.

3.3.2 Operational Controls

Operational controls are the specific actions or procedures your facility will follow to prevent or minimize negative impacts from processes or activities at your facility. It is especially important to consider those processes or activities that were identified as significant environmental aspects.

Operational controls may be a procedure or a work instruction. It may be useful to adopt the following strategy in drafting operational controls:

- For existing written operational controls, interview the staff responsible for the process or activity. Find out if anything has been changed, and why.
- For unwritten operational controls, interview the staff and draft an operational control.
- Check the Operation and Maintenance Manuals! For processes, see if trade organizations have established Best Management Practices.
- For all operational controls, get input from the staff responsible for the process, since they will be implementing

EXAMPLES of OPERATIONAL CONTROLS

- Instructions from Operation & Maintenance (O&M) Manuals for process equipment.
- Standard Operating Procedures for chemical handling.

the operational control. Their input may help in identifying and preventing and controlling environmental and worker safety and health risks.

In determining which activities require operational controls, it is helpful to use the following guidelines:

1. Identify operations associated with legal requirements, significant environmental aspects, and objectives and targets:

- Which have procedures and are documented, which have procedures but aren't documented, which don't have procedures (but need them), and which are adequately controlled with simple work instructions?
- Do your operational controls ensure regulatory compliance?

For operational controls that are linked to objectives and targets, the target measure should show that the root cause (i.e. the fundamental cause of the environmental impact) is addressed. Root cause analysis is discussed in greater detail in Section 3.4.3.

SUMMARY OF OPERATIONAL CONTROL CONSIDERATIONS

1. Are there legal obligations or significant aspects?
2. Can source reduction be utilized?
3. Are existing controls effective?
4. Can controls be improved or replaced?
5. Who is responsible for operational controls?
6. Are all operators and contractors adequately trained?

2. Determine how source reduction may address these operations:

Source reduction is about minimizing the risk of environmental impacts by using processes that are 1) inherently safe or safer than its counterparts; and 2) prevent waste from occurring in the first place. Source reduction consists of six techniques:

Emerging source reduction technologies can be researched through the TURI Library (www.turi.org) or call 978-934-3390)

- Input Substitution: replacing a toxic or hazardous substance or raw material with a non-toxic or less toxic substance.
- Product Reformulation: substituting an existing end product with one that is non-toxic or less toxic (or resource intensive) upon use, release, or disposal.
- Process Redesign or Modification: Developing and using processes of a different design than those currently used.
- Process Modernization: upgrading or replacing existing process equipment and methods with other equipment and methods based on the same process line.
- Improved Operation and Maintenance: improved housekeeping practices, system adjustments, product and process inspections, or process control equipment or methods.
- Recycling, Reuse, or Extended Use of Chemicals or Resources: Use of equipment that is integral (hard-piped) to the process line; closed-loop.

3. If source reduction is not feasible, determine what controls exist, and if they are effective:

4. Improve existing controls or to identify new ones:

Operational controls that fail to meet the objectives and targets can be improved. The existing practices may not have been appropriate or they may have been appropriate but were not properly implemented. The process of understanding failures is discussed further in Section 3.4.3.

5. Determine who is responsible for maintaining and reviewing operational controls:

For each process or activity that requires an Operational Control, you need to identify a Responsible Person for maintaining and reviewing the controls. The Responsible Person must ensure the Operational Control is consistently carried out. Depending on the size of your facility, one person may be responsible for both tasks. In larger operations, though, line workers would be responsible for implementing the operational control, while the line manager might be responsible for reviewing the operational controls.

6. Train employees and contractors on operational controls:

Once the operational controls are drafted, develop a training program for those individuals who are responsible for maintaining or reviewing the controls. Document this training as you would other EMS training modules and be sure to maintain records. Where possible, try to include operational controls training with general environmental training.

For your EMS program, the process followed for the development and implementation of operational controls should be documented, including:

- How operational controls are determined;
- How they are catalogued;
- Who is responsible for maintaining the operational controls;
- How they are developed and reviewed;
- How they are documented; and
- Where they are kept/how they are made available where needed.

3.3.3 Knowledge, Skills and Training

A successful EMS program builds upon gained knowledge and skills, and a supporting training program that fosters:

1. Awareness (i.e., informing staff of what your facility EMS is and how it works). General awareness training may include:
 - Environmental policy review
 - Significant environmental aspects and impacts identification
 - EMS roles and responsibilities designation
 - Objectives and targets attainment plans
2. Job/task-specific training
 - Task-specific procedures as they relate to your supporting

TRAINING RESOURCES

- Business networks
- Suppliers
- Trade associations
- Sister facilities/parent facility
- Contractors and consultants
- Government agencies and universities

- the EMS program
 - Training required by various environmental health and safety regulations
3. Competence (i.e., testing or other measurable criteria to ensure that staff are able to carry out their job functions in line with EMS requirements)
- Activities that extend basic training efforts and include day-to-day experience plus education

TURA agencies recommend annual compliance training for management and personnel, and initiation training for new management and personnel. See Appendix B for more information about MassDEP's Policy on EMS in Enforcement Settlements.

- Interactions typically associated with job-specific activities that may cause significant environmental impacts (e.g., wastewater treatment plant operators and hazardous waste handlers).

3.3.3.1 Conducting the Training

Often, organizations already have various training programs in place, whether it is for environmental compliance, a quality program, or as part of an industry standard. Review existing programs to determine what training already exists; then check the review of legal and other requirements to identify where training is needed, but may not yet be in place.

3.3.3.2 Documenting Training

The process that the organization follows for developing and implementing training programs must be documented in a procedure that is understood and adhered to by all staff. The EMS training procedure should address:

- How EMS training needs are determined;
- Who conducts awareness and task-specific training;
- How EMS training is documented;
- Who reviews and updates the EMS training needs;
- How often review occurs; and
- For how long documentation is retained

Finally, it is important to ensure adequate training for employees in positions with significant environmental aspects and consider how pollution prevention training can address the associated impacts.

TRAINING RECORD INFORMATION

- Training Subject Area
- Date
- Employee Name
- Date Planned
- Date Completed
- Who Conducted the Training
- Signature of Employee
- Signature of Trainer or Appropriate Contact

3.3.4 Communication Programs

Communication programs are key to ensuring that individuals working within the facility understand what is expected of them in the EMS program, and how the facility is performing in terms of meeting its EMS objectives and targets. Communication programs are also important for facilitating stakeholder (individuals/groups with an interest in your facility's environmental performance) understanding of how your EMS is working and to gain their insights on how to make it better (see Section 3.6).

Communication Programs generally involve:

- Identifying internal and external stakeholders based on the process developed in the planning stage
- Reviewing existing techniques for internal communication, including internal stakeholders
- Reviewing processes for responding to internal inquiries, and assessing their effectiveness
- Determining who has primary responsibility for external communication
- Determining what methods are used for external communication and documenting feedback
- Determining what community outreach efforts have been made and documenting feedback
- Reviewing communications programs to ensure they address the concerns of stakeholders

3.3.4.1 Stakeholders and Internal and External Communication Programs

There are two levels of communication to be concerned with: internal communication and external communication. In both instances, a successful communication program hinges on:

- Setting communication objectives in a timely manner;
- Communicating regularly and integrating EMS communication results with other EMS records; and
- Ensuring that stakeholder dialogue is a two-way process.

3.3.4.2 Setting Communication Objectives

Communication objectives help you to frame the message you want to convey about your EMS; if the objective also includes a "how", then you can begin to gain a sense for the method to most effectively communicate your message.

Your facility probably already has some communication programs in place. Think of the Right to Know station you may have in your facility as an example of a communication program. If you have the informational posters, the Material Safety Data Sheets, and contact information if employees have questions, then you have at least one internal

EXAMPLE

WHAT to Communicate:

Environmental policy to all employees

HOW to Communicate: Quick and easy fashion accessible to employees at all times.

IMPLEMENT: Have the environmental policy printed on wallet-sized cards that can be distributed to all employees, or post in the lobby of the building.

communication program in place at your facility.

3.3.4.3 Communicating Progress on the EMS

Communicating progress on your EMS is an ongoing activity that:

- Helps maintain the momentum of support for your EMS (e.g., meets the continuous improvement requirement);
- Reinforces the information you are trying to communicate; and
- Helps create two-way dialog between your facility and the stakeholders and can provide a great opportunity to get regular input from your stakeholders.

Simple and effective methods of regular internal communication include:

EXAMPLE EXTERNAL/PUBLIC COMMUNICATION PROGRAMS

Communication with external parties is considered a hallmark of environmental leadership. Consider:

- Developing a plan for informing the public about its environmental improvement activities;
- Conducting outreach or mentoring to suppliers, customers, other industry or communities; and
- Publishing an annual progress report. The Global Reporting Initiative (<http://www.gri.org>) has a standard form on its website.

- Bulletin board postings;
- Email/printed newsletters;
- Breakfast meetings or staff meetings, if they occur regularly; and
- Pre-printed messages on pay stubs or inserts in paychecks.

Examples of regular external communication include:

- Community newsletters;
- Facility tours;
- Presentations at local organizations, including Chambers of Commerce and schools; and
- Holding public meetings when you feel it is appropriate.

You will need to decide which techniques are best suited for your facility given its staff, resources, and relative

proximity and interest level of external stakeholders. You will also need to periodically review your communication programs to ensure they are effective and up-to-date.

3.3.4.4 Ensure Communication is a Two-Way Process

Whether you are dealing with internal or external stakeholders, you need a system to ensure that inquiries are addressed. This is especially important when dealing with external stakeholders. A Stakeholder Communication Record can serve to document the nature of the inquiry, to whom it was made, when it was made, what it concerned, and the response given. Documenting inquiries and responding in a timely manner can help strengthen customer and supplier relationships, investor and employee morale, and community and regulator trust.

3.3.4.5 How Much External Stakeholder Communication?

Different facilities will have varying comfort levels in discussing their EMS with external stakeholders. Involving external stakeholders early in the development of your EMS has the benefit of helping you to identify aspects and impacts that may not otherwise occur to you.

Other activities, such as responding to requests for information, can help establish you as a good neighbor and can prove to be very important to your facility if your future plans include major construction projects or expansion.

Managed properly, communicating with external stakeholders can be extremely positive, and can work to build trust between the facility and the community, even when an unforeseen accident happens. Managed poorly, communicating with external stakeholders can be a public relations nightmare, especially if the wrong person says the wrong thing at the wrong time. It is therefore important to identify who will be responsible for all external communications.

Finally, a procedure for communicating with stakeholders is critical to ensuring that the process is carried out correctly and consistently. Your procedure should address:

- Who is responsible for communicating with stakeholders;
- How stakeholders and communication programs are developed;
- Determining whether an inquiry requires follow up action; and
- How inquiries are tracked.

Do not underestimate the importance of letting your stakeholders know what you are doing to prevent and manage risks. For example, talking with your stakeholders about source reduction opportunities your facility would like to pursue can bolster your public image and help put you in touch with the resources you need to accomplish your goals.

Companies should develop a program for ongoing community outreach in the environmental aspects of their operations and general environmental awareness.

3.3.5 Emergency Preparedness and Response

Despite an organization's best efforts, the possibility of accidents and other emergency situations still exists. Effective preparation and response can reduce injuries, prevent or minimize environmental impacts, protect employees and neighbors, and reduce fiscal losses and staff downtime.

An effective emergency preparedness and response program should include provisions for:

- Assessing the potential for accidents and emergencies;
- Preventing incidents and their associated environmental impacts;
- Plans/procedures for responding to incidents;
- Periodic testing of emergency plans/procedures; and,
- Mitigating impacts associated with these incidents.

Consistent with the focus on continual improvement, it is important to review your emergency response performance after an incident has occurred. As part of this review, there is a need to determine if more training is needed or if emergency plans/procedures warrant revision.

This is another area where you should not have to start from scratch. Several environmental and health and safety regulatory programs require emergency plans and/or procedures. Look at what you have now and ask the following questions:

- Have operations and activities for potential emergency situations been reviewed?
- If not, how will this be accomplished? Who should be involved?
- Do existing emergency plans describe how incidents and associated environmental impacts will be prevented?
- If not, how will this be accomplished? Who should be involved?
- Have personnel been trained on their roles and responsibilities during emergencies?
- What emergency equipment is maintained? Is this equipment adequate for our needs?
- How do contractors and other visitors know what to do in an emergency situation?
- When was the last emergency drill? Is there a plan/schedule for conducting future drills?
- Has a feedback loop been established so we can learn from our experiences?

As part of your follow-up to implementing emergency procedures, incorporate procedures for identifying **source reduction** opportunities when evaluating why an emergency occurred.

Two planning components that many organizations overlook are how they identify the potential for accidents and emergencies and how they mitigate the impacts of such incidents. A cross-functional team can identify most potential emergencies by asking a series of “what if” questions related to hazardous materials, activities, and processes employed at the site. In addition to normal operations, the team should consider start-up and shutdown of process equipment, and other abnormal operating conditions.

Communicate with local officials (fire department, hospital, etc.) about potential emergencies at your site and how they can support your response efforts. MassDEP recommends development of

CHECKLIST FOR EMERGENCY PREPAREDNESS AND RESPONSE PLANS

Does your plan describe:

- ☐ Potential emergency situations (such as fires, explosions, spills or releases of hazardous materials, and natural disasters)?
- ☐ Hazardous materials used on-site (and their locations)?
- ☐ Key organizational responsibilities (including emergency coordinator)?
- ☐ Arrangements with local emergency support providers?
- ☐ Emergency response procedures, including emergency communication procedures?
- ☐ Locations and types of emergency response equipment?
- ☐ Maintenance of emergency response equipment?
- ☐ Training/testing of personnel, including the on-site emergency response team (if applicable)?
- ☐ Testing of alarm/public address systems?
- ☐ Evacuation routes and exits (map), and assembly points?

standard procedures for incident and noncompliance reporting to regulatory agencies, including requirements to report releases of oil and/or hazardous materials, and implementation of measures to minimize risks from such release. Mock drills can be an excellent way to reinforce training and get feedback on the effectiveness of your plans/procedure. These drills should include actual field tests simulations. Post copies of the plan (or at least critical contact names and phone numbers) at known locations and especially in areas where high hazards exist. Include phone numbers for your on-site emergency coordinator, local fire department, local police, hospital, rescue squad, or others. Revise and improve your plan as you learn from drills, training, or actual emergencies.

3.3.6 EMS Documentation and Integration

EMS documentation is related to (but not the same as) EMS records. EMS documentation describes what your system consists of and how it is revised (i.e., what you do and how you do it), while EMS records demonstrate that you are doing what the documentation said you would do, and includes training, records, calibration results, log sheets, etc. Note that records are “results”, or history, and cannot be changed.

Documentation is important to the success of your EMS for several reasons:

- Word-of-mouth information is rarely communicated consistently, whereas written information is more likely to be constant from person to person and over time.
- Some inconsistencies show up only as you commit your ideas to paper, and having a record allows you to check on progress and evaluate results.
- Documentation is vital to maintaining consistency in training and an EMS over time and from department to department. In most companies, change is a fact of life; new products are developed, the company grows, and employees change positions or leave the company. Accurate documentation will make it much easier to maintain an effective and flexible EMS during these changes.

3.3.6.1 What Constitutes EMS Documentation?

The following elements should be included in your EMS documentation:

- Your Environmental Policy;
- Your organizational structure and key responsibilities;
- A description or summary of how your organization satisfies EMS requirements (e.g., identifying environmental aspects) and associated impacts, controlling documents, complying with legal requirements, etc.);
- System-level procedures (e.g., procedures for corrective and preventive actions);
- Activity- or process-specific procedures/work instructions; and
- Other EMS-related documents (such as emergency response plans, training plans, etc.).

3.3.6.2 The EMS Manual

An EMS manual provides an organizational roadmap and explains the processes your organization implements to meet EMS criteria (such as the elements discussed in the Guide). You do not need to maintain a single “manual” that contains all of your EMS documentation; you should maintain a summary of the EMS that:

- Describes the system’s core elements (and how the elements relate to each other), and
- Provides direction to related documentation.

In addition to the EMS manual, your organization should maintain other documentation of its EMS. First, you should document the processes used to meet the EMS criteria. (For example, “How do we identify environmental aspects?” “How do we implement corrective actions?”). This documentation generally takes the form of system procedures. In addition, you might maintain area-or activity-specific documentation, such as work instructions.

WHAT DOES an EMS MANUAL CONTAIN?

The EMS Manual is an outline of your EMS. It contains your procedures for implementing the various pieces of your EMS: identifying legal requirements, identifying aspects and impacts, setting objectives and targets, determining training needs, controlling documents, keeping records, taking corrective action, audits, and management review.

Refer to Appendix D for a brief outline of an EMS Manual.

3.3.6.3 Beginning the Documentation Process

From the gap analysis, you will learn what you already have in the way of EMS documentation, and what you will need to develop. Here are questions to consider in assessing and auditing your EMS documentation:

- Do we have existing documentation of our EMS? If yes, how is this EMS documentation maintained? (i.e., electronically or in paper form)
- Who is responsible for maintaining EMS documentation within our organization?
- Do we have an EMS manual or other summary document that describes the key elements of the EMS? If so, does this document describe the linkages among system elements?
- What does our EMS documentation consist of? (List components such as environmental policy, EMS manual, activity-level procedures or work instructions, emergency plans, etc.)
- Is our EMS documentation integrated with other organizational documentation (such as human resource plans or quality procedures)?
- If so, how do we ensure proper coordination between environmental and these other functions?
- How will we keep our EMS documentation up-to-date?

3.3.6.4 How to Develop Your Documentation

Here are some suggested steps for developing an EMS documentation system. This guidance, which has been excerpted from EPA-developed documents, provides a useful structure in which to organize the process.

Step 1: Determine how EMS documentation can be integrated into existing documents.

Initially, determine what documentation already exists, what its purpose is, and whether it is effective. The goal of this search is to locate materials you can use to begin your EMS implementation and documentation. Many companies use the same format for all their documents.

STEPS TOWARDS DOCUMENTATION

1. Integrate with Existing Documents
2. Tailor to your Organization's Needs
3. Determine the Format
4. Prototype Each Document

Step 2: Tailor the documentation to your organization's individual business needs.

You will probably have to compromise in producing documentation that meets your needs while also meeting your budget. Here are some questions to help you determine what fits your needs:

- How can you modify those documents that already exist rather than creating new ones?
- Does your business operate in a single location or many? This will affect who creates some of the documents and where they are located. It may also affect how many versions of a document might be necessary to cover different circumstances.
- Does your facility have computer capability? Many companies use an electronic system to maintain documents. Are terminals available where needed? What functions will terminals have (i.e. read only or read and print)? Are users trained? Will hardcopies be needed in some areas?
- What security precautions do you need? As a computer system becomes larger and can be accessed by more people, electronic information can more likely be edited and destroyed. Security, and restrictions on who can change data, can be a critical issue for many companies.

Step 3: Determine a format for all documents

Before developing your EMS documents, plan the format (document and page appearance) for the documents to be created. Consider creating a system that allows employees to feel confident that they are using the most current and accurate revisions.

Step 4: Prototype each document

Prototyping means visualizing what you will need in the document and creating an outline for it before you actually have information to fill in. This practice is useful not only for document preparation, but for the EMS process as a whole. As you visualize what you will need in the document, you will gain understanding about what you will need from the process of developing your EMS. It's a way of "outlining" your EMS process as well as designing documents.

The best people to do prototyping are the people who will use the document. Involving them in the process gives document users the power to develop documents they will actually use – effective documents.

Helpful hints for crafting an effective EMS manual include:

- Keep EMS documentation simple. Your manual does not need to describe every detail of your EMS; instead, provide references to other documents or procedures.
- Include the organization's mission statement and vision or guiding principles in the EMS manual. These will improve understanding of the organization and how the EMS supports its overall goals.
- EMS documentation should be updated as needed, based on any system improvements you put in place. However, putting more detail in an EMS manual may increase the frequency you need to update it.

3.3.7 Document Control

A dynamic EMS must keep pace with constantly changing environmental requirements, changes in the business world, and personnel and management changes in the facility. It therefore becomes critical to the success of the EMS to devise a system for keeping documents up-to-date and ensuring that staff is working with timely information. This is document control.

Document Control generally calls for the organization to:

- Develop a procedure for controlling EMS documents.
- Determine who needs to be involved in this process, including who has the authority to revise existing EMS documents or develop new ones.
- Determine who needs access to controlled copies of EMS documents and ensure it.
- Notify users when new documents are created or existing documents are revised
- Provide a mechanism for periodic review and updating of EMS documents.
- Provide a mechanism to ensure that obsolete documents are not used
- Where possible, integrate EMS document control with other systems (such as quality)

The heart of EMS document control is the development of a procedure that outlines:

- Who is authorized to create new EMS documents and revise existing ones;
- The process for revising documents;
- Review of EMS documents to determine need for revisions and removal; and
- Where to find EMS documents.

If you have the resources, an electronic system can be used for document control. Create a document control index to track the revision history of EMS documents. If multiple copies of the same EMS document exist in your facility, keep a log of who has these copies.

3.4. CHECKING, MEASURING, CORRECTIVE and PREVENTIVE ACTION, and LEARNING

This section describes how to determine if your EMS is meeting objectives and targets, how to select indicators to reflect progress, how to measure progress in a way that is meaningful to your facility, how to correct problems when they occur, and how to prevent their recurrence. It is all part of the organizational learning process that is an inherent and essential part of the EMS.

3.4.1 Monitoring and Measurement

Through monitoring and measurement, your facility can tangibly point to where problems exist. It is through monitoring and measurement that you learn to gauge “how much” something needs to be fixed. By the same token, monitoring and measurement will help you quantify your progress, and can be extremely valuable in helping your facility to determine where it stands relative to specific compliance issues and targets. Most importantly, this process can help you determine how your EMS is working overall.

Monitoring and measurement is used to ensure that operational controls are working and to track targets. An effective monitoring and measurement program quantifies:

- Activities that have significant environmental impacts (and therefore are significant environmental aspects);
- Key aspects and environmental impacts of these operations and activities; and
- How these characteristics are measured.

Some of monitoring and measurement activities are already spelled out as part of legal requirements. For example, an air quality permit may require the facility to track gallons of paint used. Wastewater discharge permits often specify limits on different chemicals in the wastestream, and require facilities to sample and analyze wastewater to show permit limits are met. However, these types of monitoring and measuring activities address only the compliance issues of an EMS. They do not assess the overall success of the EMS itself. It is therefore necessary to consider two types of monitoring and measurement activities: EMS-wide and individual impact-level.

3.4.1.1 EMS-Wide Monitoring and Measurement

Performance indicators will help you evaluate the success of your overall EMS program, and how well the overall system for improving environmental management is functioning. A performance indicator is a specific measure that provides measurable information regarding progress toward meeting a specific environmental goal. The purpose of these indicators is different from the specific measurement criteria that are developed for evaluating progress toward individual objectives. Select performance indicators that will help you and your employees decide whether success has been achieved or whether improvement in procedures needs to be made. Examples of EMS-wide performance indicators are provided in the text box on the next page.

MONITORING and MEASUREMENT in a NUTSHELL

- Determine what type(s) of monitoring and measurement are needed to: comply with applicable legal requirements; achieve objectives and targets; and ensure correct implementation of operational controls
- Identify the equipment that will be used for any monitoring or measurement
- Properly calibrate and maintain monitoring and measurement equipment
- Document results of monitoring and measurement activities
- Evaluate results

During the gap analysis, a baseline of your organization's environmental performance is determined; subsequent improvements as a result of the EMS can be compared against this baseline. It is easier for management and staff to understand how things are going if they can compare current results against other data.

You will need performance indicators that describe how well your Environmental Policy is being implemented. In addition, you will need performance indicators for all of the various components of your EMS. The measurement criteria selected for each component of your EMS will probably be different. Consider measuring activities – number of meetings with stakeholders, number of employees trained, or number of hours of training.

Activity, however, does not always translate into results. Consider the objective of each EMS component and define a way to measure results so that you would feel satisfied that the objectives are being achieved.

**MONITORING & MEASUREMENT
EMS-WIDE vs. INDIVIDUAL IMPACT-LEVEL
MEASURES - EXAMPLES**

EMS-Wide

- Number of environmental objectives and targets met
- Average time for resolving corrective action
- Number of environmental impacts for which EMPs or operational controls have been implemented

Individual Impact-Level

- Number of complaints from community; number of responses to complaints
- Pounds of hazardous waste generated per unit product
- Energy or water use per unit of product
- Percent solid waste eliminated, reused, or recycled

Data collected on performance indicators can be quite helpful during management reviews. Select indicators that will provide top management with the information it needs to make decisions about the EMS. It is the results shown by these environmental performance indicators that will become the basis for your plans for establishing continuous improvement. It is also the ability to continually track this performance and show improvement in spite of staffing or other changes that will ultimately test the durability and success of the EMS.

3.4.1.2 Individual Impact-Level Monitoring and Measurement

Monitoring and measuring the status of individual activities is a common process in facilities, and something most people are familiar with. The following are considerations for conducting this effort as part of your EMS.

Key Characteristics. Monitor key characteristics of operations and activities that can have significant environmental impacts and/or compliance consequences. The key is to figure out what those factors are and how to measure them. Process mapping may help track material and resource flows (see Section 3.3.5).

Equipment Calibration: Identify process equipment and activities that truly affect your environmental performance. Look at those key process characteristics you identified. Some facilities place critical monitoring equipment under a special calibration and preventive maintenance program. This can help to ensure accurate monitoring and make employees aware of which instruments are most critical for environmental monitoring purposes. Some facilities also find it is

more cost-effective to subcontract calibration and maintenance of monitoring equipment than to perform these functions internally.

Focus your measurement point. Most effective environmental measurement systems use a combination of process and outcome measures. Outcome measures look at results of a process or activity, such as the amount of waste generated or the number of spills that took place. Process measures look at “upstream” factors, such as the amount of paint used per unit of product or the number of employees trained on a topic. Select a combination of process and outcome measures that are right for your facility.

Operational Performance as a Goal. Consider what information you will need to determine whether the company is implementing operational controls as intended.

Attainment of Objectives and Targets. Set up a schedule to measure progress on achieving objectives and targets on a regular basis and communicate the results of such measurement to top management.

Selecting Performance Indicators. Make sure you can commit the necessary resources to track performance information over time. It is acceptable to start small and build over time as you gain experience in evaluating your performance. Start by identifying a few performance indicators that are:

- Simple and understandable;
- Objective;
- Measurable; and
- Relevant to what your facility is trying to achieve (i.e., it makes sense relative to objectives and targets)

Communicating Performance. People respond best to information that is meaningful to “their world.” Putting environmental information in a form that is relevant to their function increases the likelihood they will act on the information. Link your measurement program with your communications program and other elements of the EMS (e.g. management reviews, see Section 5).

Pollution Prevention. Measuring pollution prevention achievements are different from, and often more difficult than, measuring environmental achievements in general. Simply measuring the reduction in a waste stream might mean only that the waste has been transferred to another medium, not reduced. It is therefore important to measure the reduction at the source of waste generation. It may also be important to measure the activities that your company directs towards pollution prevention. Sources of information include:

- | | |
|-----------------------------------|------------------------------------|
| • Permit applications | • Purchasing records |
| • Hazardous waste manifests | • Production and inventory records |
| • Toxic Release Inventory reports | • Utility bills |
| • Material Safety Data Sheets | |

3.4.2 Nonconformance and Corrective and Preventive Action

An effective EMS has mechanisms built in to it to systematically identify, correct, and prevent nonconformance. Monitoring and measurement activities (including audits) are critical components within the EMS for identifying nonconformance. Preventive and corrective action plans help reduce or eliminate recurring nonconformance. The ability to identify the root cause of nonconformance will help your facility to design effective preventive and corrective action plans.

The process of identifying nonconformances and developing a Corrective and Preventive Action entails:

- Developing a mechanism (procedure) to allow for problems to be identified and investigated;
- Identification of each problem's root cause;
- Identification, development and implementation of corrective and preventive actions;
- Reviewing operational controls and training and communication programs, revising where necessary; and
- Documenting and tracking corrective and preventive actions to verify their effectiveness.

NONCONFORMANCE VS. NONCOMPLIANCE

Noncompliance is typically an activity that is in violation of a regulation. One can think of a fine or enforcement action associated with noncompliance.

Nonconformance refers to an activity not meeting a performance standard. In an EMS, it usually refers to not meeting the ISO 14001 standard, or simply not meeting one or more parts of the facility's EMS, for example failing to meet a target.

MassDEP recommends that facilities develop a system for establishing "return to compliance" plans for any noncompliance identified during inspections or audits. See Appendix B for more information about MassDEP's Policy on EMS in Enforcement Settlements.

3.4.3 Root Cause Analysis

Understanding the root cause of the nonconformance or noncompliance will help ensure that effective corrective and preventive action is taken.

EMS nonconformances and other system deficiencies (such as legal noncompliance) should be analyzed to detect patterns or trends that work against proper EMS management. Identifying trends allows you to anticipate and prevent future problems. You will need to establish a method to determine the causes of failing to meet a target. One method is called "root cause analysis." The root cause is the fundamental reason underlying an environmental impact, noncompliance, or nonconformance. The root cause may not be the immediate explanation for the incident; you may need to conduct more investigations to discover what the actual root of the problem is.

Example Scenario –Machine #1 leaks oil

- The immediate explanation may be faulty seals, but why are the seals faulty? The seals may be faulty from wear, and may require routine replacement.
- Machine #1 may have an operation and maintenance guide that specifies regular replacement of the seals. Perhaps the machine operator or responsible maintenance person did not replace the seals as scheduled. If the operator did not follow manufacturer's directions for machine maintenance, the root cause of the problem may be lack of adequate training.
- If the operator understood the need to follow the replacement schedule but didn't, then you would need to find out why. Was it forgetfulness (failure to follow procedure) that was the root cause or were budget cuts so extreme that perceived "minor" repairs were put on hold (i.e. was lack of resources the root cause?)

3.4.4 Taking Corrective and Preventive Action

Once you document a problem with respect to meeting targets, the company must be committed to resolving it. Take action as quickly as possible. First, make sure assigned responsibilities for actions and schedules are clear.

Corrective and preventive actions should:

1. Resolve the immediate problem,
2. Consider whether the same or similar problems exist elsewhere in the organization, and
3. Prevent the problem from recurring.

This process should also define the responsibilities and schedules associated with these three steps.

Initially, your internal auditors may identify most EMS problems. However, over the long run, the people doing the work may identify many problems and generate good ideas. Find ways to get employees involved in the system improvement process (for example, suggestion boxes, contests, or incentive programs). All employees should understand the corrective action process and be encouraged to bring improvement recommendations to their supervisors. The supervisors will then initiate a corrective action request where appropriate. It's important to determine whether a lapse is temporary or due to some flaw in the procedures or controls. For this reason, communicate any findings to employees, and provide any follow-up training for resulting changes in procedures.

When conducting a root cause analysis, evaluate whether a source reduction strategy can be used as the corrective or preventive action.

If your organization has an ISO 9001 management system in place, you should already have a corrective and preventive action process for quality purposes. Use this as a model (or integrate with it) for EMS (ISO 14001) purposes. Some organizations find that they can combine some elements of their management review and corrective action processes. These organizations use a portion of their management review meetings to discuss nonconformances, evaluate causes and trends, identify corrective actions, and assign responsibilities and schedules for implementation or completion.

The amount of planning and documentation needed for corrective and preventive actions will vary with the severity of the problem and its potential environmental impacts. Simple corrective actions are often most effective. Once you document a problem, the organization must be committed to resolving it in a timely manner. Be sure that your corrective and preventive action

process specifies responsibilities and schedules for completion. Review your progress regularly and follow up to ensure that actions taken are effective.

Finally, consider how source reduction can be used to address the root cause. This is an immediate opportunity to build efficiency into your operations and prevent the problem from recurring.

3.4.5 Records

Records provide evidence that the processes that make up your EMS are being implemented as intended. The purpose of records management is fairly simple — you should be able to demonstrate that your organization is actually implementing the EMS as intended. While records have value internally, over time you may need to provide evidence of EMS implementation to external parties (such as customers, a registrar, the public, or a regulator).

The basics of records management are straightforward: you need to decide what records you will keep, how you will keep them and for how long. You should also think about how you will dispose of records once you no longer need them.

Start by identifying which EMS records are required. Look at your other procedures and work instructions to determine what evidence is needed to demonstrate effective implementation. Also consider records that are required by various legal requirements. Establish a records retention policy and stick to it. If your organization uses computers extensively, consider using an electronic EMS records management system. Think about which records might require additional security.

Organizations already keep a variety of environmental records as a part of permit or reporting requirements. Consider filing environmental records by category, as in the following list:

EXAMPLES OF EMS RECORDS

- Legal, regulatory, and other code requirements
- Results of environmental aspects identification
- Reports on meeting objectives and targets
- Permits, licenses, and other approvals
- Job descriptions and performance evaluations
- EMS audits and regulatory compliance audits
- Identified nonconformities, corrective action
- Plans and corrective action tracking data
- Hazardous material spill/other incident reports
- Communications with customers, suppliers, etc.
- Results of management reviews
- Sampling and monitoring data
- Equipment maintenance and calibration records

- Air Emissions Regulations
- Air Emissions Inventories (HAPS/VOCs)
- Air Emissions Permits/Applications and Fees
- Annual Licenses & Fees
- Community Right-to-Know
- EPCRA Regulations
- EPCRA Reporting
- Hazardous Waste Regulations
- Hazardous Waste Permit/ID Number
- Hazardous Waste Fees
- Hazardous Waste Biennial Report
- Hazardous Waste Manifests
- Pollution Prevention (P2) Regulations
- Pollution Prevention Reporting and Fees
- TUR Reports and Plans
- Recycling Projects
- Special Waste Inventories
- Solid Waste Permit
- Solid Waste Fees
- Spill Reports and Associated Response Actions
- Stormwater Regulations
- Stormwater Permit
- Wastewater Regulations
- Wastewater Permit and Fees

- Indoor Air Quality
- Other Permits & Permit Applications
- Wastewater: Semi-Annual Reporting
- Wastewater Analysis

Finally, review environmental records for opportunities to implement source reduction projects. Review legal and other requirements to determine where a candidate source reduction requirement can reduce your record keeping obligations.

OTA has developed software applications to help facilities comply with particular reporting and recordkeeping requirements for degreasing operations, volatile organic compounds, etc., that are available on their website (www.mass.gov/envir/ota) or by contacting OTA at 617-626-1060.

3.4.6 EMS Audits

Once your organization has established its EMS, verifying successful implementation of the system is critical. To identify and resolve EMS deficiencies you must actively seek them out. Periodic EMS audits will help determine whether all of the requirements of the EMS are being carried out in a timely manner. They may also be used to identify opportunities for continuous improvement.

Audit procedures should describe:

- Audit planning
- Audit scope (areas and activities covered)
- Audit frequency
- Audit methods
- Key responsibilities
- Reporting mechanisms
- Record keeping

To determine an appropriate frequency of your EMS audits, consider the following factors:

- The nature of your operations and activities,
- Your significant environmental aspects and impacts, and
- The results of your monitoring processes and previous audits.

As a rule of thumb, all parts of the EMS should be audited at least annually. You can audit the entire EMS at one time or break it down into discrete elements for more frequent audits. (There may be advantageous to conducting frequent audits, but the decision is up to you.) Internal audits, which are conducted by people within your organization who are not directly associated with the activity or process being audited, may be conducted more frequently. For facilities seeking certification under a specific EMS framework (e.g., ISO 14001 or Responsible Care®), external auditing may be required by an approved Registrar. The frequency of these audits would be dependent upon the certification criteria of the EMS framework itself (refer to Section 3).

BASICS OF AN EFFECTIVE AUDIT SYSTEM IN EMS

- Develop audit procedures and protocols;
- Determine an appropriate audit frequency;
- Select and train your auditors;
- Maintain audit records;
- Link results to the corrective and preventive action process;
- Report EMS deficiencies to management;
- Maintain management focus on the environment;
- Improve the EMS and its performance, and
- Ensure the system's cost-effectiveness.

MassDEP recommends that schedules and systems be developed for conducting regular inspections of operations and facilities, and annual self-audits of operations and facilities for the purpose of preventing and controlling releases, ensuring environmental protection, and maintaining compliance with statutory and regulatory requirements. See Appendix B for more information about MassDEP's Policy on EMS in Enforcement Settlements.

As part of your audits, it is critical that you regularly review your company's environmental aspects and associated impacts as well as identified targets and objectives. Things to pay particular attention to might include:

- New process review — have any changes introduced new environmental aspects?
- Worksheets from the most recent environmental aspect identification and ranking sessions — is there new information on chemical effects? Is there a need to change how ranking is done?
- Communication received from stakeholders — do any comments suggest a need for re-ranking your aspects?
- Environmental objectives and targets — are new ones required as a result of new processes, changes to environmental regulations or simply as part of continual improvement?
- Pollution prevention program — has information become available from this effort that would add aspects or objectives?
- Audit program — have your audits turned up information about where your EMS and environmental programs could be improved? Would this information be useful in your aspect identification process or in redesigning your objectives?

TURI offers an 8-hour workshop on Internal Auditing an EMS. Visit TURI's website (www.turi.org) to find out when the next workshop is being held.

Regularly revisiting your environmental aspects and objectives is an essential step in developing an EMS that achieves the goal of continuous environmental improvements. The regular review of aspects can be used to change the priorities you set, or it can be used to examine a part of your company's activities that you did not audit in the previous cycle. The regular review can be part of a planned "phasing in" process, wherein different parts of your company's operations are reviewed until all your company's activities are included in your EMS. The regular review of aspects is the foundation for your company's continuing improvement.

3.4.6.1 Auditor Selection

You should select and train EMS auditors. Auditor training should be both initial and ongoing. Auditors should be trained in auditing techniques and management system concepts. Familiarity with environmental regulations, facility operations, and environmental science can be advantageous, and in some cases may be essential to

Auditors should never audit their own work.

adequately assess the effectiveness of the EMS. Some auditor training can be obtained on-the-job. Your organization's first few EMS audits can be considered part of auditor training, but make sure that an experienced auditor leads or takes part in those "training" audits.

If possible, train at least two people as internal auditors. This will allow your auditors to work as a team. It also allows audits to take place when one auditor has a schedule conflict, which is often unavoidable in smaller organizations.

3.4.6.2 Management Review of Audits

Management can use EMS audit results to identify trends or patterns in EMS deficiencies. The organization also should ensure that identified system gaps or deficiencies are corrected in a timely fashion and that corrective actions are documented. This is a critical component of the organization's commitment to continual improvement, as it gives upper management the information required to monitor the company's performance and improvement, and propel the process forward. See Section 3.5 for more information about the Management Review process.

3.4.6.3 Conducting the Audit

Your EMS audits focus on objective evidence of conformance. Before you start an audit, be sure to communicate the audit scope, criteria, schedule, and other pertinent information to the people in the affected area(s). This helps to avoid confusion and facilitate the audit process. During an audit, auditors should review identified deficiencies with people who work in the relevant area(s). This will help the auditors verify that their audit findings are correct. This also can reinforce employee awareness of EMS requirements.

An EMS audit is a check on how well your system meets your own established EMS requirements. An EMS audit is not an audit of how well employees do their jobs. Audits should be judged on the quality of findings, rather than on the number of findings.

Both MassDEP and EPA have policies in place that encourage facilities to audit their processes and self-report violations. The EPA has prepared guidance documents and protocols for conducting environmental compliance audits under a number of its regulatory programs. You can learn more about MassDEP's Environmental Audit Policy at www.mass.gov/dep/enf/enfpol.htm.

In accordance with MassDEP's Environmental Audit Policy, a regulated company that discloses to MassDEP regulatory problems identified as part of an audit may be subject to penalty relief. In accordance with MassDEP's Guidance on Incorporating Environmental Management Systems into Enforcement Negotiations and Settlements, if a regulated entity discovers and discloses compliance problems through its implementation of an EMS, MassDEP may waive the punitive portion of the penalty, consistent with the Environmental Audit Policy.

The audit is an opportunity to identify deficiencies and how to improve the system overall. Your audit is a prime opportunity to look at source reduction as a strategy for improving your environmental performance.

3.5. MANAGEMENT REVIEW

The Management Review is the final element in the EMS cycle. It is an opportunity to fine-tune the system and make course corrections as needed. Management determines whether or not the EMS is functioning properly, where additional resources need to be allocated, and if the environmental policy is appropriate or needs to be changed. It is the responsibility of the EMS Management Representative to provide senior management with sufficient information to make an assessment of the effectiveness of the EMS. The review of the EMS by upper management is a critical activity, which should be scheduled at strategic intervals, and is ultimately responsible for driving the continual improvement process that is the crux of a good EMS.

It is the responsibility of senior management to:

- Determine who should be involved in the review process;
- Determine the best time to conduct the management review and how frequently the reviews will be scheduled;
- Review sufficient material in order to decide whether the EMS is effective adequate and suitable;
- Tie the management review process to continual improvement actions and plans;
- Determine if the EMS procedures and activities add value, and if not, eliminate them; and
- Continue to provide leadership in institutionalizing the EMS.

There is a wealth of information that the Environmental Management Representative can present to management for review, including:

- Audit results – EMS and Compliance
- Internal suggestions
- External communications
- Progress on achieving objectives and targets
- Other environmental performance measures
- Reports of emergencies, spills, other incidents/accidents
- New or modified laws/regulations
- New scientific/technical data on materials and processes used by the organization
- Status of Corrective Action Requests
- Results action items from previous management review meeting

In order to assure an efficient and effective review process, the Environmental Management Representative should be strategic in selecting information to present (i.e., be concise, offer only relevant information, etc.). The review process is a formal element of the EMS, and should be treated accordingly. Meeting minutes should be taken and retained as part of the EMS Document Control process.

The Environmental Management Representative must ensure that management review decisions for improvements are incorporated, documented and communicated within the EMS, and that any recommendations of management reviews are tracked, acted upon and reported within the EMS.

3.6. CREATING A STAKEHOLDER PROGRAM FOR YOUR EMS

Your EMS can include a successful and predictable program that addresses stakeholder aspects. The management program tools and forms you have used to troubleshoot processes, create and manage solutions evaluate and measure progress, etc, can be used just as effectively here. Typical benefits that facilities have identified from this type of program include problems solved, improved rapport and trust, improved community reputation, faster permitting, less litigation, fewer meetings or hearings, quicker process changeover, less prescriptive operations permitting, and fresh perspectives and learning. Remember, to reduce liabilities and related costs, learn exactly what you are dealing with so that you can target your EMS programs to control, stabilize and reduce risk.

3.6.1 Who are Stakeholders and What are Their Concerns?

To begin, consider who the organization's stakeholders are and what they want. Stakeholders can include suppliers, customers, stockholders and inspectors. They may be part of a citizen's advisory committee or a community negotiation effort convened by a state or federal project, an independent citizen organization initiative, or other individual or group. Organizations whose employees are represented by a union may need to consider this group as well.

3.6.1.1 What are Your Program Goals and Scope?

What are you already doing that brings you together with interested parties? Existing company activities can include public relations, a public hearing, public education, advocacy or other outreach initiative. As you consider what you know so far about stakeholder concerns and your company's historic goals in its outreach efforts, clarify and focus your new stakeholder program and state a purpose and goal.

At this early stage, it is helpful to also define the scope of the program. For example, one organization may decide to include pollution risk, traffic, noise, and aesthetics of Facility A, but not Facility B. The stakeholders will bring their goals to the table, and the process should allow flexibility for adjusting the goals and scope at the first meetings.

3.6.2 Credibility in the Handling of Stakeholder Feedback is Crucial to Success

Without credibility in the stakeholder program, key stakeholders may not participate and the results will not be accepted. To ensure credibility, the Stakeholder program should have visible support from top-level decision makers, clear intentions concerning feedback generated by stakeholders, and a visible and participative process.

The program will foster communication and the identification of strategies for actions that address problems or potential for problems. How are decisions concerning these strategies to be handled? What if there are conflicting opinions about best strategies? This scenario can be alarming for a facility to consider, but can usually be satisfactorily handled with a clear process in place. The key is to make this process something that the stakeholders understand and agree to up front, which they will if it is essentially fair and they have been able to contribute to its design. Stakeholders do not expect to control decisions about private property or to override business issues. However, they will want to know that honest concerns are creatively considered, and recommendations passed to high levels in the company for some kind of response. Expectations concerning recommendations and the resolution of conflicts should be stated and understood on both sides. For example, “The CEO will attend every third meeting for a report-out, to hear recommendations and to say what has been happening with previous recommendations.”

HANDLING STAKEHOLDER MEETINGS

At the first meeting, be structured about addressing the following issues:

1. What is the schedule for future meetings?
2. What are the expected time commitments?
3. What is the process for ensuring parties are invited to speak?
4. How will conflicts and disruptive behavior be addressed?
5. Who is not here that should be, and how can we get them here?
6. How will be report out to our company or our group?
7. Will we speak to the press and when?
8. Who is responsible for minutes, time keeping and facilitation?

3.6.3 What are Elements of a Good Stakeholder Program?

A good program should provide for the following activities:

- Initiation – Get started by reading reports, talking to staff and external parties who have engaged in past initiatives, writing summary proposed topics and participants, setting the time and place for meeting, and – if desired – contracting with a professional facilitator.
- Resources – Identify money, time, and sponsorship needed and ensure these are in place. Your ability to control the process is in inverse relationship to the resources and planning you invest.
- Participation – Get key stakeholders to participate by asking your team who needs to be at meetings and what are barriers for their attendance? What about populations or individuals who work long hours and are not reimbursed for time taken to participate, or who must care for children? Make a plan for contacting people and ensuring your sincere welcome is understood. Can you offer a small stipend? Those that don’t come early may pop in at a later stage with surprises, after your core group is well down the road toward trust and successful attention to problems.
- Process – As with other critical elements of your management system, you can create an EMP (see Section 3.2.4) identifying policies, strategies, roles and responsibilities and targets and objectives for your stakeholder program. Use teams and problem solving tools such as process diagramming, brainstorming and root cause analysis to create projects and procedures to achieve targets and objectives. Finally, include this program in your self-assessment audits and corrective actions to improve.

4. OTHER ENVIRONMENTAL MANAGEMENT SYSTEM FRAMEWORKS

One of the key points of EMS development and implementation is to avoid redoing work. Throughout Planning, Implementation, and Measurement and Preventive/Corrective Action, you are encouraged to make use of existing environmental health and safety systems, procedures, and record keeping or documentation that your facility may already have in place. An EMS that does not seem completely foreign is also likely to be more accepted and practiced among the staff at your facility.

Similarly, your facility may have already undertaken an effort to develop systems, procedures, and record keeping and documentation under any one of a number of environmental management initiatives and/or regulations. Some common systems, or frameworks, are listed below and described in more detail in Appendix E. We have compared these frameworks with the EMS guidance in this document in order to show you what you may need to add to your system if you wish to have an effective and robust EMS.

The following is a brief summary of other common system frameworks with which your facility may already be familiar.

4.1. ISO 14001

ISO 14001 is an international standard for environmental management systems. Of the environmental management frameworks, ISO 14001 is probably the most familiar. Some companies adopt this framework to improve international competitiveness as a result of certification to the ISO 14001 standard. In addition, other states have used the ISO 14001 model as the basis for their own EMS and environmental performance recognition programs.

ISO 14001 generally requires:

1. Environmental Policy
2. Planning
 - Environmental Aspects
 - Legal and Other Requirements
 - Objectives and Targets
 - Environmental Management Programs
3. Implementation and Operation
 - Structure and Responsibility
 - Training, Awareness, and Competence
 - Communication
 - Environmental Management Systems Documentation
 - Document Control
 - Operational Control
 - Emergency Preparedness and Response
4. Checking and Corrective Action
 - Monitoring and Measurement

- Nonconformance, Corrective, and Preventive Action
- Records
- Environmental Management System Audit

5. Management Review

4.2. RESPONSIBLE CARE®

Responsible Care® originated in Canada in 1988 as a means of communicating with the public about chemical manufacture and use. The American Chemistry Council now requires all member companies to adopt the Responsible Care® code. Responsible Care® is based on 10 elements:

1. Guiding Principles.
2. Codes of Management Practices
3. Dialog with the Public
4. Self-Evaluations
5. Measures of Performance
6. Performance Goals
7. Management Systems Verification
8. Mutual Assistance
9. Partnership Program
10. Obligation of Membership.

Responsible Care® has been updated to include third party certification requirements, similar to ISO 14001. The new standard is referred to as RC-14001.

4.3. TOXICS USE REDUCTION (TUR) PLANNING

In 1989, Massachusetts Legislature passed the Toxics Use Reduction Act, or TURA. The regulation calls for facilities to report on chemical use and generate plans for reducing their use if these conditions are met:

- Facility is in SIC Codes 10-14, 20-40, 44-51, 72, 73, 75, or 76;
- Facility has 10 or more full-time employees (or meets an equivalent of 20,000 work hours per year); and
- The facility manufactures or processes 25,000 lbs. or otherwise uses 10,000 lbs. of a listed chemical [although lower thresholds have been established for persistent, bioaccumulative, and toxic (PBT) chemicals].

A TUR Plan is required for each chemical reported beyond one year. The TUR planning framework includes:

- Management Policy
- Scope of TUR Plan
- Employee Notification (six months before plan due date) and Involvement
- Cross-functional planning team
- Process characterization

- Procedure to identify TUR options
- Evaluate TUR Options
- Options to Implement
- Project reduction (byproduct and emissions)
- Implementation schedule
- Develop Plan Summary

The plan is certified by a management official at the facility and a MassDEP-authorized Toxics Use Reduction Planner. The TUR Plan remains on-site; a Plan Summary is submitted to MassDEP and provides an overview of the chemical, production unit, TUR project, and proposed reduction target.

A Plan Update must be submitted every two years from the date the initial plan is due. The Plan Update is essentially the “continuous improvement” component of the TUR Plan.

The Office of Technical Assistance offers assistance with TUR planning through a guidance manual entitled “A Practical Guide to Toxic Use Reduction Planning”, which is available by contacting OTA at 617-626-1060.

OTA has assisted several Massachusetts companies with TUR planning. One company, Acushnet Rubber, built on its TUR planning effort to become ISO 14001 certified. This is highlighted in an OTA case study available at OTA’s website (www.mass.gov/envir/ota) or by contacting them

4.4. MASSACHUSETTS ENVIRONMENTAL RESULTS PROGRAM (ERP)

ERP is a process-specific set of operating, maintenance, and record-keeping requirements related to a facility’s operations. Currently, frameworks exist for photo processors, dry cleaners, printers, and new boiler installations. The ERP Program replaces certain permits issued by the Department of Environmental Protection with a self-certification statement.

ERP covers:

- Planning
- Aspects and impacts are addressed as certification statement questions
- ERP manuals typically include pollution prevention information related to the process
- Training, Awareness, and Competence (based on the ERP sector)
- Operational controls (typically performance standards cited in the manual and certification statement)
- Documentation (facilities advised to keep a copy of the manual on site as well as monitoring records)
- Document Control (limited – retention time for monitoring records)
- Emergency Preparedness and Response
- Monitoring and Measurement
- Non-conformance and corrective action (i.e. Return to Compliance Plans are submitted to MassDEP)

- Records (facilities are required to maintain logs of monitoring and measuring activities)
- Reporting (to MassDEP)
- Management review (i.e. the certification statement must be signed by an authority in the facility)

4.5. NATIONAL PERFORMANCE TRACK PROGRAM

EPA's Performance Track program is designed to reward those companies that have demonstrated environmental performance by implementing an EMS. The program is open to large and small business, as well as state and federal agencies that have completed at least one full cycle of plan-do-check-act.

A facility that wishes to enroll in Performance Track must apply to EPA and undergo a compliance screen and review of environmental performance data based on the EMS. The EMS model highlighted in Performance Track loosely follows ISO 14001 and aligns well with the guidance in this document. Facilities must have:

- Environmental policy
- Planning
- Implementation and Operation
- Checking and Corrective Action
- Management Review

Once accepted into the program, facilities must submit an annual performance report. The report format is based on the Global Reporting Initiative, and is made publicly available.

In accordance with its EMS in enforcement settlements guidance (Appendix B), MassDEP may recognize Performance Track participants in good standing by making them eligible for reduced penalties and by choosing not to conduct routine regulatory compliance inspections.

5. GLOSSARY

Alternatives evaluation - A systematic evaluation of alternative ways to accomplish a task that reviews the cost, performance, and environmental impact of each alternative under consideration. Ideally, the range of evaluation would include alternative chemicals, products, processes, technology, work procedures, and disposal methods.

Ancillary material - Material input that is used by the unit process producing the product, but is not used directly in the formation of the product.

Aspect, environmental - Element of an organization's activities, products, and services that can interact with the environment.

Assessment - An estimate or determination of the significance, importance, or value of something.

Assessment, environmental - A systematic, documented, periodic and objective review by company management of facility operations and practices related to meeting environmental requirements. The assessment is a systematic, documented verification process of objectively obtaining and evaluating evidence to determine whether specified environmental activities, events, conditions, management systems, or information about these matters conform with selected criteria, and communicating the results of this process to management.

Audit, compliance – Process of determining whether the organization meets environmental and other applicable legal requirements.

Audit, EMS - A process of objectively obtaining and evaluating evidence to determine whether an organization's EMS is operating as intended.

Baseline environmental conditions – Organization's performance before EMS implementation.

Certification - Procedure by which a third party gives written assurance that a product, process, or service conforms to specified requirements.

Commitment to compliance - Organization's pledge to achieve and/or maintaining regulatory compliance. Evidence of this pledge includes documented procedures for periodic regulatory compliance audits and corrective actions taken.

Compliance – A judgment that the supplier of a product or service has met the requirements of the relevant specifications, contract, or regulation; state of meeting the requirements.

Compliance review - A periodic assessment of your organization's compliance with environmental legal requirements.

Continual improvement - Process of consistently enhancing the environmental management system, in line with the organization's environmental policy.

Corrective action - An action taken to eliminate the causes of an existing nonconformity, defect, or other undesirable situation in order to prevent recurrence.

Document control - A system to ensure responsible management of all EMS documents.

Effects - Refers to changes, actual or potential, caused by a chemical, activity, or process as it comes into contact with humans or the environment.

Emergency Response and Preparedness Program - A program that plans and prepares for emergencies, such as employee injuries or hazardous chemical spills.

Environment - Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation.

Environmental Management System (EMS) - A continual cycle of developing, planning, implementing, reviewing and improving the actions that an organization takes to meet its

environmental obligations, including but not limited to: Organizational structure, responsibilities, practices, procedures, processes, and resources.

Environmental policy - Statement by the organization of its intentions and principles in relation to its overall environmental performance, which provides a framework for action and for the setting of its environmental objectives and targets.

Fenceline – The boundary of the organization’s EMS, e.g. a single process line or the entire facility.

Footprint, environmental – Refers to the environmental impact a facility creates relative to its use of materials.

Gap analysis or preliminary review - A review of an organization’s position with regard to the environment done in advance of or at the beginning stages of planning the EMS. The review should cover three key areas: legislative and regulatory requirements, identification of significant environmental aspects, and an examination of all existing environmental management practices.

Hazard - The ability to cause damage.

Impact, environmental - Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization’s activities, products, or services.

Inputs and outputs - Material or energy that crosses a unit process boundary. Example materials may include raw materials, products, emissions, and waste.

Interested party - Individual or group concerned with or affected by the environmental performance of an organization.

ISO 14001 - A widely accepted, official international standard for environmental management systems.

Life cycle - Consecutive and inter-linked stages of a product system, from raw material acquisition or generation of natural resources to the final disposal.

Life-cycle assessment (LCA) - Compilation and evaluation, according to a systematic set of procedures, of the inputs and outputs of materials and energy and the potential environmental impacts of a product system throughout its life cycle.

Life-cycle characterization - Element of the life-cycle impact assessment phase in which the potential impacts associated with the inventory data in each of the selected categories are analyzed.

Manager, EMS - Organization employee charged with initiating and leading EMS implementation.

Media - The means or substance through which something is transmitted, e.g., air, water, or soil.

Metrics, environmental - Measurable parameters that reflect environmental performance trends.

Objective, environmental - Overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve, and that is quantified where practicable.

Operational control - The identification, planning, and management of operations and activities in line with the EMS policy, objectives, and targets.

Participants, EMS - Anyone involved with implementation of EMS elements, including aspect and impact or compliance review, achieving objectives and targets, and collecting measurement and monitoring data.

Performance indicator, environmental - A specific datum selected, such as volume of a chemical used, which will provide measurable information regarding progress toward meeting a specific environmental goal.

Performance, environmental - The measurable results of the environmental management system, related to an organization's control of its environmental aspects, based on its environmental policy, objectives, and targets.

Pollution prevention (P2) - Use of processes, practices, materials, or products at the beginning of a process that avoid, reduce, minimize, or control pollution, which may include recycling, treatment, process changes, control mechanisms, innovative technologies, efficient use of resources, and materials substitutions.

Preventive action: An action taken to address and prevent a deficiency or noncompliance with environmental standards or regulations.

Prioritization criteria - Criteria for prioritizing environmental aspects.

Procedure - A specified way to perform an activity.

Process - A set of interrelated resources and activities that transform inputs into outputs.

Process characterization – a method for defining and accounting for the flow of materials, resources, and wastes that are involved in the making of a products or delivery of a service.

Product - Any good or service.

Records - Proof of legal, financial, environmental, or other activities taken in the course of business.

Resource conservation – practice of reducing, reusing, or recycling water, energy, labor, or other chemicals or materials so as to prevent waste.

Risk - The probability that something undesirable will happen from exposure to a hazard.

Root cause - A fundamental deficiency that results in a nonconformance and must be corrected to prevent recurrence of the same or similar nonconformance.

Source reduction – practice of preventing waste upstream in the process rather than downstream.

Stakeholders - Those groups and organizations having an interest or stake in a company's EMS program (e.g., regulators, shareholders, customers, suppliers, special interest groups, neighboring residents, competitors, investors, bankers, press, lawyers, insurance companies, trade groups, unions, etc.).

Steering group, EMS - Small group of EMS participants and organization administrators providing (1) guidance via response to EMS briefings and (2) feedback via management review to the EMS Team to ensure progress, effectiveness, and wise use of EMS resources.

Substitutes - A chemical, product, process, or technology, which is used in place of another to perform the same function or achieve the same end result.

Target, environmental - Detailed performance requirement, quantified wherever practicable, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives. Such targets feature measurable parameters and timelines for attainment.

Team, EMS - Core group of people potentially comprised of organization staff, faculty, students, departmental leads, and administration responsible for day-to-day EMS activities.

Volatile - Ability to evaporate easily.

Waste - Any non-product or non-service output from an organization; usually disposed material.

Appendices and Supplements

Appendix A EMS Resources and Publications

Appendix B MassDEP's Policy on EMS in Enforcement Settlements

Appendix C ISO 14001 Compared to Toxics Use Reduction Planning

Appendix D Sample EMS Forms and Procedures

Appendix E Details on Other Environmental Management System Frameworks

Supplement 1: EMS for GOVERNMENT AGENCIES: MASSACHUSETTS STATE
SUSTAINABILITY PROGRAM

Supplement 2: USING OUTSIDE SERVICES

APPENDIX A

EMS RESOURCES AND PUBLICATIONS

WEB RESOURCES

The Company Manual Template for Integrated Management Systems for Small Businesses, developed by EPA (EPA 744-R-00-012, 2000), provides a comprehensive set of procedures and worksheets that can be used in the development of your EMS. http://www.epa.gov/dfe/pubs/iems/iems_template/template.pdf

A comprehensive review of management systems for cleaner production. Excellent introduction to EMS and the motives for implementing EMS. <http://www.cleanerproduction.com/tools/ems.htm>

EPA's information on its EMS pilot program for Small and Medium Sized Enterprises (SMEs). <http://www.epa.gov/OW-OWM.html/iso14001/wm046200.htm#EMS%20DEMO>

Pollution Prevention Regional Information Center (Texas) topic hub presenting various links and resources. <http://p2ric.org/TopicHubs/toc.cfm?hub=9&subsec=7&nav=7>

The Peer Center provides an excellent resource for municipalities (and SMEs) developing and implementing EMS. <http://www.peercenter.net/index.cfm>

P2 Pays presents a summary of related articles and links: <http://www.p2pays.org/iso/main/articles.htm>

The Multi-State Work Group is an organization of state agencies that are actively promoting EMS in their states. This website provides information on the latest regulations and guidance for EMS, and innovative programs that are being considered across the US. <http://www.iwrc.org/mswg/>

The US EPA National Performance Track program provides many resources for environmental leaders. <http://www.epa.gov/cgi-bin/epaprintonly.cgi>

The ISO organization provides guidance on the ISO 14000 standard. <http://www.iso.ch/iso/en/iso9000-14000/iso14000/iso14000index.html>

ARTICLES, JOURNALS AND BOOKS

This is a summary of the resources available through the Massachusetts Toxics Use Reduction Institute's Technology, Health and Environment library. All resources in the library can be found by accessing the Greenlist on TURI's website: <http://www.turi.org/greenlist>. Abstracts for the resources presented below can also be found on this site, or by contacting TURI's Resource Specialist at 978-934-3275.

Environmental Management Systems: Do They Improve Performance? Department of Public Policy, University of North Carolina at Chapel Hill, Environmental Law Institute, United States Environmental Protection Agency, and The Multi-State Working Group on Environmental Management Systems, 2003

Environmental Management Systems - Managing Cost-Effectively While Assuring Compliance by F. Friedman, Corporate Environmental Strategy, June 2003

Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations (Second Edition) by P. Stapleton, Philip J. et al, NSF International, 2001

Environmental Management - the European Way by A. Baumast, Corporate Environmental Strategy, vol. 8, no. 2, 2001

Green Profits: The Manager's Handbook for ISO 14001 and Pollution Prevention by N. Cheremisinoff and A. Bendavid-Val, Butterworth-Heinemann, 2001

Greener Manufacturing and Operations: From Design to Delivery and Back by J. Sarkis, Greenleaf Publishing, 2001

Integrated Management Systems - Opportunities and Risks for Corporate Environmental Protection by A. von Ahsen and D. Funck, Corporate Environmental Strategy, vol. 8, no. 2, 2001

Regulating from the Inside: Can Environmental Management Systems Achieve Policy Goals? by G. Coglianese and J. Nash, Resources for the Future, 2001

Standardizing Excellence: Working with Smaller Businesses to Implement Environmental Management Systems, Green Business Network and the National Environmental Education & Training Foundation, 2001

EMAS and ISO 14001 Implementation Case Studies, Volume II, B. Tener, Cutter Information, 2000

Integrated Environmental Management Systems, Implementation Guide, United States Environmental Protection Agency Office of Pollution Prevention and Toxics, 2000

ISO 14001: Case Studies and Practical Experiences by R. Hillary, Greenleaf Publishing, 2000

ISO 14001 and EPA's Region I's StarTrack Program: Assessing Their Potential as Tools in Environmental Protection by J. Nash, et al, Massachusetts Institute of Technology (MIT) and National Academy of Public Administration, 2000

Draft Action Plan for Promoting the Use of Environmental Management Systems (EMS), U.S. Environmental Protection Agency, 1999

EMSs, Environmental Performance, and Compliance (Draft), Multi-State Working Group, 1999

Environmental Management Systems: A Sustainable Strategy for a Sustainable World? by R. Andrews, et al, University of North Carolina at Chapel Hill, 1999 (Eighth International Conference on the Greening of Industry Network)

Environmental Management Systems: A Workshop for Metal Finishers by P Davis and K. Anderson, NSF-International, 1999

Environmental Management Strategies - The 21st Century Perspective by G. Crognale, Prentice Hall, 1999

GETF- Assistance for Local Governments that Wish to Design and Implement Voluntary Environmental Management Systems (EMS), U.S. Environmental Protection Agency, 1999

Identifying Environmental Aspects and Impacts by M.R. Block, ASQ Quality Press, 1999

Opportunities and Constraints for Product-Oriented Environmental Management Systems (P-EMS) by R. van Berkel, et al., Journal of Cleaner Production, vol. 7, no. 6, 1999

U.S. Postal Service Northeast Area Master Plans: Cutting Edge Environmental Management for the Real World by C. Vidich and R. Robbins, Environmental Quality Management, Summer 1999

Environmental Management Systems: A Guide for Metal Finishers by C.A. Branson and S.P. Davis, NSF International, 1998

EMAS and ISO 14001 Implementation Case Studies by K.M. Victory, Business and the Environment, Cutter Information Corp., 1998

Environmental Management Systems: A Guide for Planning, Development, and Implementation by J.G. Martin, J. G. and G.J. Edgley, Government Institutes, 1998

A Green Plan for Industry: 16 Steps to Environmental Excellence by D.J. Schell, Government Institutes, 1998

Implementing an Environmental Management System in Community Based Organizations, Part 1: Project Report, by S. P. Davis, NSF International and U.S. Environmental Protection Agency, 1998

International Environmental Risk Management: ISO 14000 and the Systems Approach by J. Voorhees and R. Woellner, Lewis Publishers, 1998

ISO 14001: A Missed Opportunity for Sustainable Global Industrial Development by R. Krut and H. Gleckman, Earthscan Publications Ltd., 1998

ISO 14000- Case Studies, Global Environment & Technology Foundation, 1998

Moving Beyond Environmental Compliance - A Handbook for Integrating Pollution Prevention with ISO 14000 by T.E. Welch, T.E., Lewis Publishers, 1998

A-Z of Corporate Environmental Management by K. Sadgrove, K., Earthscan Publications Ltd., 1997

Corporate Environmental Management 2: Culture and Organization, R. Welford, 1997

How to Control Costs in Your Pollution Prevention Program by J.A. Cichowicz, John Wiley & Sons, Inc., 1997

Printed Wiring Board, Case Study 8: Building an Environmental Management System: H-R Industries' Experience, United States Environmental Protection Agency, 1997

Corporate Environmental Management: Systems and Strategies by R. Welford, 1996

Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations, United States Environmental Protection Agency, 1996

Environmental Management Systems: Specification with Guidance for Use. ANSI/ISO 14001-1996, NSF International, 1996

Metal Finishing Guidance Manual - A Practical Guide to Environmental Compliance and Continuous Improvement, National Association of Metal Finishers (NAMF) and Metal Finishing Suppliers Association (MFSA) and American Electroplaters and Surface Finishers Society (AESF), 1996

Ontario Health Care Pollution Prevention and Environmental Management Training Workshop, Great Lakes Pollution Prevention Center and Broadhurst Environmental Management, Inc., 1996

Environmental Management Systems Training Manual, Canadian Center for Pollution Prevention, 1995

APPENDIX B

MassDEP's POLICY on EMS in ENFORCEMENT SETTLEMENTS

I INTRODUCTION TO DEPARTMENT OF ENVIRONMENTAL PROTECTION (MassDEP) ENFORCEMENT POLICIES

In January 2001 the MassDEP issued a document entitled “*Guidance on Incorporating Environmental Management Systems Into Enforcement Negotiations and Settlements.*” The full text of this document is available over the internet at <http://www.state.ma.us/dep/enf/enforce.htm> - policies. The MassDEP believes that implementation of an effective environmental management system (EMS) can improve an organization's environmental performance. An EMS is appropriate for many types of organizations of varying sizes in public and private sectors. MassDEP therefore supports and encourages any organization seeking to improve its environmental performance through the implementation of an EMS. One method through which MassDEP intends to promote EMSs is the incorporation of EMSs in the settlement of enforcement cases where appropriate. The guidance is intended to promote EMSs during the negotiation and settlement of enforcement cases and it supplements the MassDEP 1997 Enforcement Response Guidance.

To that end, the guidance sets forth:

- The *role of MassDEP* in promoting EMSs through the settlement of enforcement cases;
- The *appropriate use of EMSs* in resolving enforcement cases;
- The types of higher level enforcement cases most suitable for incorporating an EMS requirement;
- An explanation about how this guidance *relates to, and clarifies existing enforcement policy and guidance*;
- *Key elements of a compliance-focused EMS*; and
- *MassDEP expectations* about the development and implementation of EMSs.

II. PROMOTION OF EMSs THROUGH ENFORCEMENT

MassDEP adopted the following principles in promoting EMSs through negotiation and settlement of enforcement cases:

APPLICABILITY

1. Limited To Higher Level Enforcement Cases

MassDEP will include provisions concerning implementation of an EMS *only in cases involving higher level enforcement* (i.e., cases in which an enforcement response is greater than a Notice of Noncompliance). The MassDEP, however, recognizes the benefits of an EMS in preventing any type of regulatory noncompliance and supports its use irrespective of any enforcement actions.

2. Necessary Compliance Assurance Activity

MassDEP considers the adoption and implementation of an EMS to be *part of the activity necessary* for a regulated entity that routinely engages in activity regulated by MassDEP to return to, achieve, maintain and/or improve overall environmental compliance. Accordingly, in higher-level enforcement cases involving such regulated entities, MassDEP may accept, at its sole discretion, and then require establishment of an EMS as a condition of settlement. Use of the EMS considers the nature of the regulated entity, the nature of the violations and the degree of noncompliance. *Examples* of higher-level enforcement cases that *may be appropriate* for incorporating an EMS include:

- Cases involving regulated entities in violation of multiple MassDEP program requirements;
- Cases involving regulated entities with multiple facilities within Massachusetts;
- Cases involving municipalities;
- Cases involving state agencies and authorities;
- Cases involving sectors specifically targeted by MassDEP for promotion of EMSs; and
- Other cases in which facts compel the promotion of an EMS.

There may also be higher-level enforcement cases for which requiring establishment of an EMS is *not* a desirable or effective condition of settlement. *Examples* of cases that may be *inappropriate* for incorporating EMSs include:

- Cases involving one-time wetlands violations;
- Cases involving violations applicable to residential properties and committed by the homeowner;
- Cases involving criminal violations*; and/or
- Cases involving regulated entities that do not have the ability, reliability and/or willingness to adopt and implement an EMS.

* In some criminal cases where there is significant or the potential for significant harm, the establishment of an EMS may be appropriate if there is no system in place to provide oversight and assurance of the regulatory compliance process.

PENALTY CALCULATION

The Administrative Penalties Act (M.G.L. Chapter 21A, Section 16) requires MassDEP to consider a number of criteria in determining the appropriate amount of an administrative penalty. One of those criteria is the demonstration of “good faith” by the violator to correct and prevent future noncompliance. MassDEP may consider a commitment to develop an EMS as a demonstration of the *existence of good faith* that may be used to reduce the amount of a penalty by up to fifty percent. If no EMS exists at the time of MassDEP’s inspection, the amount of penalty adjustment may depend upon the extent or size of the “footprint” of the EMS that the regulated entity promises to do. Where an EMS exists at the time of inspection, but it was not previously required by MassDEP, the regulated entity may agree to modify the EMS in return for a penalty adjustment. *Where a regulated entity has an EMS in place at the time of the initial inspection that was previously required in a consent order with MassDEP*, MassDEP may consider the noncompliance as evidence of “lack of good faith” and may then calculate a “lack of good faith” *increase* of up to 50% of the penalty.

KEY ELEMENTS REQUIRED IN LIEU OF MANDATING A TYPE OF EMS

MassDEP will not mandate any particular type of EMS although MassDEP may require that certain key elements, outlined in the guide, be contained in each EMS required in the resolution of an enforcement matter. MassDEP may encourage the development of EMS templates for use by specific public and private sectors through a variety of means.

III. RELATIONSHIP OF THIS GUIDANCE TO EXISTING ENFORCEMENT POLICY AND GUIDANCE**A. 1997 Enforcement Response Guidance**

The guidance serves to amend the 1997 MassDEP Enforcement Response Guidance (ERG), to include EMS in the list of MassDEP goals and objectives advanced by the ERG to improve a regulated entity's environmental performance.

SMALL BUSINESS POLICY

The Small Business Policy provides for suspension or waiver of a penalty if a small business satisfies certain conditions, including a *demonstration of a good faith intention to maintain future compliance*. MassDEP considers the development and establishment of an EMS to satisfy the demonstration of such good faith intention.

The Small Business Policy provides that if a small business, as that term is defined in the Small Business Policy, agrees to develop and establish an EMS, *and* satisfies all other conditions specified in the policy, MassDEP may suspend or waive the *entire* penalty in accordance with the policy. If a small business agrees to develop and establish an EMS, but does *not* satisfy *all* other specified conditions, MassDEP may reduce the penalty.

B. Municipal Policy

The Municipal Policy provides for suspension or waiver of a penalty if a municipality satisfies certain conditions, including *demonstration of a good faith intention to maintain future compliance*. MassDEP considers the development and establishment of an EMS to satisfy the demonstration of good faith intention.

The Municipal Policy provides that if a municipality agrees to develop and establish an EMS, *and* satisfies all other conditions specified in the policy, MassDEP may suspend or waive the *entire* penalty in accordance with the policy. If a municipality agrees to develop and establish an EMS, but does *not* satisfy all other specified conditions, MassDEP may reduce the penalty consistent with the MassDEP guidance.

In addition, the Municipal Policy provides that compliance problems discovered through a "municipal environmental audit" or through "due diligence," as those terms are defined in the policy may be subject to penalty relief. If a municipality implements an EMS that requires the municipality to review and evaluate its environmental compliance systematically and periodically, MassDEP may consider the EMS to be consistent with "municipal environmental audit" and "due diligence."

ENVIRONMENTAL AUDIT POLICY

The Environmental Audit Policy (or “Audit Policy”) provides that compliance problems discovered and disclosed to MassDEP through an “environmental audit” or through “due diligence,” as those terms are defined in the policy, may be subject to penalty relief. If a regulated entity implements an EMS that requires a systematic and periodic review and evaluation of its environmental compliance, MassDEP may consider the EMS to be consistent with “environmental audit” and “due diligence.” Thus, if a regulated entity discovers compliance problems through its implementation of an EMS, and discloses the problems, MassDEP may waive the punitive portion of the penalty.

C. Supplemental Environmental Project Policy

The MassDEP Supplemental Environmental Project (“SEP”) Policy defines a SEP as an “environmentally beneficial” project which a regulated entity agrees to undertake “in settlement of an enforcement action,” but which the regulated entity is “not otherwise legally required to perform.”

The concept of an EMS as a condition of settlement in an enforcement action is similar in certain respects to the concept of a SEP in that:

- Each may be considered “environmentally beneficial,”
- Each is being undertaken by a regulated entity “in settlement of an enforcement action,” and
- A regulated entity is “not otherwise legally required to perform” either one.

However, MassDEP considers the development and implementation of an EMS **principally** to be part of the *activity necessary* for a regulated entity to return to, achieve, maintain and/or improve overall environmental compliance. MassDEP considers the performance of a SEP **principally** to be *beyond what is necessary* to return to compliance and continually assure future compliance with environmental requirements. Thus, MassDEP does not consider an EMS to be a category of SEP.

This means a case settlement may contain both an agreement to develop and establish an EMS **and** an agreement to perform a SEP of some nature. In that situation, the EMS agreement is considered evidence of good faith, as described above, and the penalty is calculated accordingly. Once the penalty is calculated, the amount of the penalty may be reduced up to 75% in consideration of the SEP performance.

F. Massachusetts Stewardship and EPA Performance Track Programs

The Executive Office of Environmental Affairs (EOEA) has established a Massachusetts Stewardship program for superior environmental performers, which is described elsewhere in this guide. The U.S. Environmental Protection Agency administers a similar Performance Track Program. In both programs, facilities voluntarily adopt and self-certify to an EMS. Participants conduct compliance and environmental management system audits in accordance with each program’s guidelines. EOEA and EPA will accept facilities into the programs if they check and correct violations, document past environmental improvement, commit to continuous improvement, have a record of sustained compliance and do public outreach and reporting. Once

accepted, both programs award facilities incentives, including: low priority for inspection; penalty mitigation for good faith participation; use of a logo; listing on a web site and other benefits.

Provided that each participant's EMS contains elements to identify and correct violations, MassDEP may recognize Stewardship or Performance Track participants in good standing, by:

1. Reducing penalties and exempting certain violations from higher level enforcement as described in enforcement guidance, provided that any harm caused was remedied immediately, and that all violations:
 - Were corrected as soon as possible;
 - Are not likely to cause imminent and substantial endangerment;
 - Did not cause serious actual harm;
 - Are not criminal;
 - Afforded no significant economic benefit; and
 - Did not violate the terms of any judicial or administrative order or any consent agreement.
2. Choosing not to conduct routine regulatory compliance inspections and instead observing audits conducted by facilities or conducting random audits. MassDEP may conduct inspections in response to imminent and substantial endangerment, a tip, or a complaint concerning potential civil or criminal violations at the facility.

IV. KEY ELEMENTS OF A COMPLIANCE-FOCUSED EMS

A consent order may require the regulated entity to develop an EMS manual tailored to reflect the size, complexity and environmental conditions and circumstances of its operations. The EMS manual should be organized to clearly address, at a minimum, the key elements listed below.

The key elements are closely inter-related components of an EMS for which subsystems and documented procedures should be developed and fully integrated if the entire program is to be effective. The key elements will usually be included in consent orders as a complete group; however, individual elements may need to be modified to reflect conditions and circumstances of a specific regulated entity.

Each regulated entity should implement an EMS to ensure that the regulated entity achieves and maintains compliance with the environmental requirements including, at a minimum, the development and implementation of:

1. Environmental compliance policies, procedures and guidance documents for all of the organization's operations and activities;
2. Clearly specified organizational responsibilities and accountability of organization's staff and management, on-site service providers, and contractors for regulatory compliance, required reporting to regulatory agencies, and corrective actions implemented in their area(s) of responsibility;

3. A system for identifying applicable regulations, tracking compliance activities, and reporting results to management;
4. Schedules based on the environmental importance of activities and a system for conducting regular inspections of operations and facilities and objective annual self-audits of operations and facilities for the purposes of preventing and controlling releases, ensuring environmental protection, and maintaining compliance with statutory and regulatory requirements;
5. A system (procedures, work instructions and forms) for ensuring that routine requirements for sampling, monitoring, and reporting data required by law, regulation and permit are accomplished;
6. Standard procedures and requirements for incident and noncompliance reporting to management and to regulatory agencies, including requirements to report releases of oil and/or hazardous materials and implementation of measures to minimize risks from such releases;
7. A system of corrective and preventive action for establishing return to compliance plans for noncompliance identified during inspections and audits;
8. A system for the development of continuous improvement goals and reporting results to management and other interested parties that may include: recycling and the purchase of recycled products; pollution prevention; source reduction; resource conservation; energy consumption; waste minimization, renewable energy and renewable technologies;
9. Annual compliance training for management and personnel, and initiation training for new management and personnel;
10. A process for an objective annual review by management including the evaluation of the effectiveness of the EMS and its components. This includes: implementation of corrective and preventive actions as necessary to ensure timely compliance and a commitment to continual improvement, and senior management review to ensure that goals are being achieved;
11. Program for ongoing community outreach in the environmental aspects of regulated entity's operations and general environmental awareness.

The EMS should describe how these key elements will be integrated into the organization's overall decision making and planning, and in particular, decisions on capital improvements, product and process design, training programs and maintenance activities.

V. ASSURING COMPLIANCE WITH EMS REQUIREMENTS IN CONSENT ORDERS

The consent order will describe the *regulated entity's role* in assuring compliance with the provisions requiring development and implementation of an EMS, or modification of an existing EMS.

The following principles apply to the roles of the regulated entity in assuring compliance with EMS requirements contained in consent orders.

The consent order should require the regulated entity, at a minimum and as scheduled in the consent order to:

1. Provide periodic written reports to MassDEP on progress in developing an EMS, or modifying an existing EMS;
2. Provide a written report to MassDEP describing the final EMS and a plan for implementing it;
3. Provide a written report verifying that the final EMS is implemented in one of the following forms:
 - Report of an independent qualified EMS auditor; or
 - Self-certification by an officer or manager within the regulated entity with the authority to spend money and assign staff.
4. Provide periodic reports to MassDEP detailing the extent to which the EMS continues to be implemented and effective.

MassDEP acceptance of the submittals listed immediately above will constitute neither approval of the submittals nor an evaluation of EMS implementation or effectiveness. However, if MassDEP observes noncompliance during future inspections of the regulated entity, MassDEP may consider the effectiveness of an EMS previously required in a consent order when MassDEP develops an enforcement response to the future noncompliance. Submission of any of the written reports may, of course, be supplemented by a meeting with MassDEP managers and staff to discuss contents of the reports.

Example Case of the Use of an EMS

A New England company was fined \$140,000 for hazardous waste violations spanning from 1993 to 1996. The company failed to properly label and store hazardous waste that could have resulted in the risk of fire and explosion and improper disposal. Also cited was inadequate record keeping for employee hazardous waste training programs.

Using a compliance-focused EMS, this company could improve regulatory compliance and prevent future fines by taking the following steps:

1. Establish a procedure to identify all applicable regulatory requirements including the labeling and storage of hazardous waste;
2. Establish specific work instructions to ensure that all hazardous waste requirements are implemented;

3. Establish an internal auditing procedure to periodically evaluate regulatory compliance, giving high priority to areas with significant environmental aspects (like hazardous waste), and report the results to management;
4. Define a corrective and preventative action procedure and take action in a timely manner on any audit findings including a regulatory noncompliance. Track the progress of corrective actions and report to management;
5. Define and document training needs and qualifications (education, training and experience) of all employees handling hazardous waste. Maintain training records and verify during internal audits;
6. Periodically conduct a management review of the EMS to ensure that it is effective and implement any changes to improve the system.

ISO 14001	310 Code of Massachusetts Regulations
4 Environmental Management Systems Requirements	
4.1 General Requirements	
4.2 Environmental Policy Organizational statement of intentions and principles in relation to its overall environmental performance and includes a commitment to continual improvement and prevention of pollution.	50.43(1) Facility-Wide Information Required: Management Policy
4.3 Planning	
4.3.1 Environmental Aspects The organization shall establish and maintain a procedure to identify the environmental aspects of its activities, products or services that it can control and over which it can be expected to have an influence, in order to determine those which have or can have significant impacts on the environment.	50.42(9) Standard Engineering Practices 50.44(2abc) Use of Byproducts/Emissions
4.3.2 Legal and Other Requirements Establish and maintain a procedure to identify and have access to legal and other requirements to which the organization subscribes directly applicable to the environmental aspects of its activities, products, or services.	50.32(1) Reporting Requirements 50.47(1) Plan Summary 50.48(1) Plan Updates
4.3.3 Objectives and Targets When establishing and reviewing its objectives, and organization shall consider the legal and other requirements, its significant aspects, its technological options and its financial, operational and business requirements, and the views of interested parties. The objectives and targets shall be consistent with the environmental policy, including the commitment to prevention of pollution.	50.4 Toxics Use Reduction Plans 50.41 Applicability and Schedule 50.42(6) Amounts of Toxics Used, Information Source, Calc. Methods 50.43(2) Scope of Plan 50.44(6) Amount of emissions released to the environment or transferred offsite 50.44(8) 2 & 5 Year BRI Goals shall be developed based on the toxics use reduction techniques chosen to be implemented in the plan 50.45 Total cost of toxics and the cost of the covered toxic per unit of product 50.46(1)(2)(3)(4abc)(5ab)(6abcd)(7) Technical and economic evaluation of TUR techniques
4.3.4 Environmental Management Program(s) The organization shall establish and maintain (a) program(s) for achieving its objectives and targets. It shall include: a) designation of responsibility for achieving objectives and targets at each relevant function and level of the organization; b) the means and time-frame by which they are to be achieved. If a project relates to new developments and new or modified activities, products or services, program(s) shall be amended where relevant to ensure that environmental management applies to such projects.	50.46(1)(2)(3)(4abc)(5ab)(6abcd)(7) Technical and economic evaluation of TUR techniques
4.4 Implementation and Operation	
4.4.1 Structure and Responsibility The organization's top management shall appoint (a) specific management representative(s) who, irrespective of other responsibilities and authority for ensuring that environmental management system requirements are established, implemented and maintained.	50.32(5) Reporting Requirements 50.42(1)(2)(3)(4) General Plan Requirements: Each covered toxic; Each production unit; Planner signature; Manager signature 50.44(7) Cost of the Use of Toxics 50.5 TUR Planners

ISO 14001	310 Code of Massachusetts Regulations
<p>4.4.2 Training, Awareness and Competence Establish and maintain procedures to make its employees or members at each relevant function and level aware of the importance of conformance with the environmental policy and procedures and with the requirements of the environmental management system. Personnel performing the tasks which can cause significant environmental impacts shall be competent on the basis of appropriate education, training and/or experience.</p>	<p>50.42(5) Employee Involvement 50.44(4) Purpose that the Toxic Serves in Production Unit 50.44(5) Toxics users shall determine the amount of byproduct treated, recycled, and disposed of on-site, or released 50.44(6) Amount of emissions released to the environment or transferred off-site</p>
<p>4.4.3 Communication Establish and maintain procedures for internal communication between the various levels and functions of the organization and external sources.</p>	<p>50.42(5) Employee Involvement 50.42(7) Plan Availability</p>
<p>4.4.4 Environmental Management System Documentation The organization shall establish and maintain information, in paper or electronic form, to describe the core elements of the management system and their interaction.</p>	<p>50.36 Recordkeeping Requirements 50.47(1) Plan Summary 50.48(1) Plan Updates</p>
<p>4.4.5 Document Control Establish and maintain procedures for controlling all</p>	<p>50.36 Recordkeeping Requirements</p>
<p>4.4.6 Operational Control Establishing and maintaining documented procedures to cover situations where their absence could lead to deviations from the environmental policy and the objectives and targets; and stipulating operating criteria in the procedures.</p>	<p>50.44(1) Production Unit Information Required: Process Flow Diagram 50.44(2abc) Use of Byproducts/Emissions 50.44(3) Unit of Product Associated with the Production Unit</p>
<p>4.4.7 Emergency Preparedness and Response</p>	<p>na</p>
<p>4.5 Checking and Corrective Action</p>	
<p>4.5.1 Monitoring and Measurement Establish and maintain documented procedures to monitor and measure on a regular basis the key characteristics of its operations and activities that can have a significant impact on the environment. Maintain a document procedure for periodically evaluating compliance with relevant environmental legislation and regulations.</p>	<p>50.32(7) Reporting Requirements 50.42(6) Amounts of Toxics Used, Information Source, Calc. Methods 50.44(5) Toxics users shall determine the amount of byproduct treated, recycled, and disposed of on-site, or released 50.44(6) Amount of emissions released to the environment or transferred off-site 50.46(1)(2)(3)(4abc)(5ab)(6abcd)(7) Technical and economic evaluation of TUR techniques</p>
<p>4.5.2 Nonconformance and Corrective and Preventive Action Establish and maintain procedures for defining responsibility and authority for handling and investigating non-conformance, taking action to mitigate any impacts caused and for initiating and completing corrective and preventive action.</p>	<p>50.49(1)(2)(3) Deficient TUR Plans</p>
<p>4.5.3 Records Establish and maintain procedures for the identification, maintenance and disposition of environmental records. These records shall include training records and the results of audits and reviews.</p>	<p>50.33 Content of Report 50.34 Reporting Forms 50.36 Recordkeeping Requirements 50.4 Toxics Use Reduction Plans 50.42(7) Plan Availability 50.44(2abc) Use of Byproducts/Emissions 50.44(3) Unit of Product Associated with the Production Unit</p>
<p>4.5.4 Environmental Management System Audit Audits of the EMS should be conducted on a periodic basis to determine whether the environmental system conforms to planned arrangements and has been properly implemented and maintained.</p>	<p>50.35(1)(2)(3) Deficient Toxic Use Reports</p>

ISO 14001	310 Code of Massachusetts Regulations
<p>4.6 Management Review</p> <p>The management review shall address the possible need for changes to policy, objectives and other elements of the environmental management system, in the light of environmental management system audit results, changing circumstances and the commitment to continual improvement.</p>	<p>50.35(1)(2)(3) Deficient Toxic Use Reports</p> <p>50.42(1)(2)(3)(4) General Plan Requirements: Each covered toxic; Each production unit; Planner signature; Manager signature</p> <p>50.42(10)(11) Good Faith; Reasonable Effort</p> <p>50.43(3)(4) Expected Changes in Use, Byproduct</p> <p>50.46(1)(2)(3)(4abc)(5ab)(6abcd)(7) Technical and economic evaluation of TUR techniques</p>

APPENDIX D

SAMPLE EMS FORMS and PROCEDURES

This section contains examples of forms and procedures that would be included as part of an EMS Manual and as part of EMS development and implementation. This represents one way of coordinating each of the procedures required in developing an EMS, and should not be considered the only way of accomplishing this. Every facility will have different ideas about how to organize their EMS development activities.

The information is arranged as follows:

1. EMS Manual outline;
2. EMS Forms and Procedures for the overall EMS; and
3. Worksheets for specific EMS activities (e.g. identifying aspects and impacts)

The material in this section has been extracted from various EPA publications on EMS implementation and development which are provided in Appendix A.

EMS Manual Outline

Scope of the EMS

Environmental Policy

EMS Responsibilities

Procedure for Identifying Environmental Aspects

Documentation of Aspects

Process Flow Diagrams

List of Environmental Aspects

List of Health, Safety, and Potential Environmental Concerns

Exposure to Chemicals and Materials

Procedure for Identifying Legal and Other Requirements

Documentation of Legal and Other Requirements

List of Applicable Legal Requirements

Procedure for Identifying Significant Environmental Aspects

Documentation of Significant Environmental Aspects

Form for Determining Significant Environmental Aspects

Procedure for Setting Objectives and Targets, Developing Environmental Management Programs

Documentation of Objectives, Targets, and Environmental Management Programs

Form for Setting Environmental Objectives

Forms for Developing Environmental Management Plan

Procedure for Conducting an Alternatives Evaluation

Documentation for Conducting an Alternatives Evaluation

Form for Identifying Alternatives

- Form for Evaluating Alternatives
- Form for Evaluating Environmental Effects
- Form for Evaluating Performance
- Form for Evaluating Regulatory Concerns
- Form for Evaluating Costs

Procedure for Developing Operational Controls

Documentation

- Operational Control Procedures

Procedure for Establishing Knowledge Skills and Training

Procedure for Emergency Preparedness and Response

Documentation and Document Control

Procedure for Conducting a Compliance Assessment

Documentation

- Compliance Tracking Form

Procedure for Conducting an Internal Assessment

Documentation

- Internal Assessment Checklist

- Internal Assessment Record

Corrective Action Procedure

Documentation

- Corrective Action Form

Procedure for Communicating with Stakeholders

Documentation

- Stakeholders and Environmental Issues Form

- Stakeholder Communication Record

Procedure for Management Review

Documentation

.....
.....Management Review Record

EMS Responsibilities

The following table lists _____ management representative, coordinator, and EMS committee:

EMS Function	Name	Regular Position
Management Representative		
EMS Coordinator		
EMS Committee		

Contact Person: _____

Date Completed: _____

Sample Procedure for Identifying Environmental Aspects*Purpose*

In order to understand and manage its actual and potential environmental impacts, _____ identifies the environmental aspects of its activities, products, and services as they fall within the scope of the EMS. As a subset of this activity, _____ identifies the health and environmental concerns related to particular chemicals used in the plant.

Procedure

1. Using processing mapping (or input/output flow charts), the EMS committee identifies the basic manufacturing and supporting operations that fall within the scope of the EMS.
2. The EMS coordinator arranges for the environmental aspects of these operations to be identified by a team of several employees from the operation in question, using the process mapping approach where feasible and under the oversight of the EMS coordinator or a committee member where appropriate.
3. Environmental aspects, and their actual or potential impacts (quantified to the extent possible), are listed by operation using the Environmental Aspects Form.
4. If the environmental aspect involves use of a potentially harmful chemical, the EMS committee is responsible for researching the known health and environmental concerns and listing these using the Environmental and Health Effects Form.

Frequency

This procedure is repeated annually to ensure that any new environmental aspects are identified.

Records

Basic and Supporting Operations, Flow Diagrams, Environmental Aspects, and Health and Environmental Concerns Forms are maintained by the EMS coordinator.

Basic and Supporting Operations

The following are the basic (manufacturing) and supporting operations that fall within the scope of _____'s EMS:

1.

2.

3.

4.

5.

6.

7.

Contact Person:_____

Date Completed:_____

Environmental Aspects

Environmental aspects of the basic and supporting operations are listed in the following table.

Operation	Input/Output	Environmental Aspect (quantify if readily possible)	Environmental Impact

Contact Person: _____

Date Completed: _____

Health, Safety, and Potential Environmental Concerns

Work Activity/ Chemical	Environmental Aspect	Information Source	Regulatory Data				Human Health Effects by Pathways Acute and Chronic			Effects on Wildlife or Other Environmental Effects			Safety Concerns	Rank	
			Carcinogen?	OSHA Permissible Exposure Limit (PEL)?	Volatile Organic Compound (VOC)?	Toxic Release Inventory (TRI)?	Inhalation	Dermal	Ingestion	Air	Water	Land		Human	Environment

Contact Person: _____

Date Completed: _____

Exposure to Chemicals and Materials

Operation	Aspect	Quantity Used per Time Period	Exposure Time		Personal Protective Equipment (PPE)	Pathway		Rank Exposed Groups		
			Duration	Frequency		Human (inhalation, dermal, oral)	Environmental (air, water, land)	Workers	Community	Environment

Contact Person: _____

Date Completed: _____

Identification of Legal Requirements

Purpose

_____ is committed to complying with all applicable environmental regulations. This procedure describes how _____ identifies applicable regulations.

Procedure

1. The EMS management representative is responsible for tracking applicable environmental laws and regulations and evaluating their potential impact on the company's operations. He or she employs several techniques to track, identify, and evaluate applicable laws and regulations. These techniques include commercial databases, information from the trade association, direct communication with national and state regulatory agencies, and periodic refresher training on environmental laws.
2. As necessary, the management representative may call upon off-site resources such as consultants or attorneys.
3. The management representative compiles and maintains updated copies of applicable environmental laws and regulations.
4. The management representative, working with the EMS coordinator and committee, correlate these regulations to the business activities and environmental aspects associated with them.

Frequency

Periodic: depends on information source.

Records

Records are maintained by the EMS coordinator. The EMS management representative maintains copies of the applicable regulations.

Applicable Legal Requirements

The following table provides a list of environmental regulations that apply to _____'s activities. The specific operation(s) to which each regulation applies are also shown.

Regulatory Agency	Regulation and Specific Provision	Operation(s) to which Provision Applies

Contact Person: _____

Date Completed: _____

Identification of Significant Environmental Aspects

Purpose

_____ focuses its management efforts on the most significant of its environmental aspects. To determine its significant environmental aspects, _____ systematically evaluates its environmental aspects using environmental and business criteria.

Procedure

1. The EMS coordinator compiles a master list of environmental aspects based on the lists submitted from each. Where appropriate, individual aspects are grouped. (For example, if consumption of energy is listed as an environmental aspect in several areas, the coordinator could choose to group these listings such that consumption of energy appears just once on the master list.)
2. The EMS committee then rates each aspect according to the following criteria:
 - Regulatory concerns
 - Pollution
 - Risk, including effects of chemicals and materials, impact on workers, impact on the surrounding community, impact on the environment, safety, and noise
 - Natural resource use
3. Aspects are assigned a relative value of L, M-L, M, M-H, or H in each category, where **L** stands for low impact (or risk, or potential for regulatory issues), **M** for medium, and **H** for high. Recorded data are used to assist the committee in rating each aspect in the categories of risk and regulatory concerns, respectively.
4. A “Total Ranking” is developed for each aspect by adding the scores for each category using the following values: L = 1; M-L = 2; M = 3; M-H = 4; H = 5.
5. The committee makes a final determination as to which aspects are significant. As a general guide, the aspects that score the highest number of points are considered significant. The committee, however, should use its best judgment in determining significance.
6. Aspects identified as significant are indicated.
7. At this point, the EMS committee may take an initial cut at developing indicators, which will be reviewed later.

Frequency

This procedure is repeated on an annual basis.

Records

Records on determining significant environmental aspects are maintained by the EMS coordinator.

Determining Significant Environmental Aspects

The following table shows the EMS committee's evaluation of the _____'s environmental aspects based on selected criteria. Those aspects chosen as significant are indicated in the final column.

Operation	Aspect	Regulatory Concern	Chemical and Material Risk— Effects and Exposure			Worker Safety	Other Community Issues	Natural Resources	Overall Ranking	Significant?
			Worker	Community	Environmental					

Contact Person: _____

Date Completed: _____

Development of Objectives, Targets, and Action Plans

Purpose

The _____ sets objectives for environmental improvement and develops targets and action plans to meet those objectives. These objectives are generally directly related to the company's significant environmental aspects and follow from its environmental policy commitments.

Procedure

1. Top plant management sets environmental objectives for the _____ such that the plant has one or more environmental objectives at any one time. The current environmental objectives are recorded. Where possible, environmental objectives are quantified and at least one indicator developed.
2. The EMS committee is responsible for developing and recommending potential new environmental objectives to top plant management. In identifying potential new objectives, the committee considers the following:
 - Environmental policy
 - The significant environmental aspects of the company, considering especially those significant environmental aspects that pose chemical risk
 - Applicable laws and regulations and potential future laws and regulations
 - Practical business criteria, such as the potential costs and benefits of pursuing a particular environmental objective
 - The views of employees and other interested parties
3. Once environmental objectives are established by top plant management, the EMS coordinator assigns responsibility (to the manager of the operations in question, where appropriate) for developing targets and action plans to realize the objectives. The targets and action plan that correspond to each objective are recorded by the responsible person. Sometimes, this may require an alternatives evaluation as the first target (or action item). See "Conducting an Alternatives Evaluation," for more detail.

Frequency

Environmental objectives are reviewed on a yearly basis. The targets and action plans are developed and revised as needed by the committee.

Records

Environmental objectives are recorded, and the targets and action plans that correspond to each objective are recorded using the Environmental Management Program Action Plan. The EMS coordinator is responsible for maintaining these records.

Form for Environmental Objectives

The following is a list of _____'s current environmental objectives.

Objective	Related significant environmental aspect	Related Environmental Policy Provision	Performance Measurement Indicator(s)

Contact Person: _____

Date

Completed:

Environmental Management Programs

Objective	
Indicator(s)	
<i>Target # 1</i>	
Action Plan	
Person(s) responsible:	
Budget	
Schedule	
Review cycle	
<i>Target # 2</i>	
Action Plan	
Person(s) responsible	
Budget	
Schedule	
Review cycle	
<i>Target # 3</i>	
Action Plan	
Person(s) responsible	
Budget	
Schedule	
Review cycle	

Contact Person:_____

Date Completed:_____

Procedure for Conducting an Alternatives Evaluation

Purpose

_____ periodically conducts an alternatives evaluation to identify viable approaches to reaching an environmental objective. An alternatives evaluation is a tool for identifying alternative products and/or processes and evaluating them compared to the baseline based on business and environmental criteria.

Procedure

1. The EMS coordinator appoints a small group, overseen by a committee member or by the relevant operations manager, to identify and evaluate alternatives to a particular activity or process where an alternatives evaluation is required for meeting an environmental objective.
2. The group first identifies the function that this activity or process performs in _____'s operations. The group also characterizes the baseline, or the current manner in which the function is being carried out.
3. The group then brainstorms alternative ways of accomplishing this function. Potential alternatives include using a different material or chemical, changing work practices, and/or changing process technologies. Alternatives are recorded, and the most promising alternatives are assigned to individual members of the group for further research.
4. The group then evaluates the baseline and alternatives based on the following considerations: operational performance, cost, regulatory implications, and environmental impact.
5. The group makes a recommendation and presents its recommendation to the EMS committee and appropriate operations managers.

Frequency

As often as necessary in the context of developing targets and action plans to meet environmental objectives.

Records

Alternatives Identification and Evaluation of Alternatives are maintained by the EMS coordinator to provide, as necessary, supporting documentation.

Alternatives Identification

Significant Environmental Aspect(s):

Function:

	Baseline	Potential Alternatives
Products		
Technologies		
Work Practices		
Recycling/Reuse		
Treatment		
Disposal		

Contact Person:_____

Date Completed:_____

Evaluation of Alternatives

Significant Environmental Aspect(s):

Function:

Alternative	Performance	Regulatory Considerations	Cost	Environmental Effects	Overall Evaluation
Baseline					

Contact Person:_____ Date Completed:_____

Evaluation of Environmental Effects

Significant Environmental Aspect(s):

Function:

Alternative	Regulatory Concern	Chemical and Material Risk— Effects and Exposure			Worker Safety	Other Community Issues	Natural Resources	Overall Rank	Preferred Alternative? (Y/N)
		Workers	Community	Environment					
Baseline									

Contact Person:_____ Date Completed:_____

Evaluation of Performance

Significant Environmental Aspect(s):

Function:

Alternative	How Well it Works	Time	Ease of Use	Overall Performance Evaluation
Baseline				

Contact Person:_____

Date Completed:_____

Form for Evaluation of Regulatory Concerns

Significant Environmental Aspect(s):

Function:

Alternative	Applicable Regulations	Required Controls	Cost of Compliance	Overall Regulatory Concerns Evaluation
Baseline				

Contact Person:_____Date Completed:_____

Form for Evaluation of Costs

Significant Environmental Aspect(s):

Function:

Alternative	Raw Material	Labor	Disposal	Total Cost	Savings	Net Cost
Baseline						

Contact Person:_____Date Completed:_____

Development of Operational Controls

Purpose

By developing operational control procedures for critical activities (i.e., those activities associated with significant environmental aspects), _____ intends to mitigate and control, to the extent possible, the environmental impacts associated with its significant environmental aspects.

Procedure

1. The EMS committee, with additional input from other employees as needed, carries out a root cause analysis of each significant environmental aspect to determine the underlying cause(s) of the environmental impact. As part of the root cause analysis, the committee will determine the need for (and adequacy of, if already existing) operational control procedures to control the critical activities related to the significant environmental aspect in question and record its findings on the Operational Control Procedures Form. The committee, with input from operations managers as needed, will also select one or more indicators per significant environmental aspect for purposes of monitoring _____'s environmental performance as related to the significant environmental aspects.
2. Where there is a need to create or modify an operational control procedure, the EMS committee assigns a member of the committee to draft an operational control procedure, based on consultation with the employees who undertake that procedure. In many cases, a separate operational control procedure may not be required, rather the integration of environmental control procedures into an existing procedure. The operational control procedure should take the form of a "Work Instruction," namely a summary list of required steps or measures. In addition to describing the steps necessary to carry out the particular activity in an environmentally sound manner, the work instruction should also include steps to conduct monitoring, where applicable.
3. After the operational control procedure has been developed and implemented, its status is recorded as such on the Operational Control Procedures form. The procedure itself enters into the relevant _____ operator's handbook and/or is posted at the site of the activity in question.

Frequency

As new significant environmental aspects are identified. For existing significant environmental aspects, a review of the associated root cause analysis and operational control procedures is conducted yearly.

Records

EMS Operational Control Procedures are maintained by the EMS coordinator. The procedures themselves are maintained in the relevant _____ operator's handbook and/or posted at the site of the activity in question.

Form for EMS Operational Control Procedures

Significant Environmental Aspect	Indicator(s)	Associated Job Functions	Existing Operational Control Procedures	Operational Control Procedures Development/ Modification Needed	Responsible/ Status	Location Posted

Contact Person:_____

Date Completed:_____

Knowledge Skills and Training

Purpose

To ensure that its employees carry out their duties in as environmentally responsible a manner as possible, _____ provides all employees with environmental awareness training on environmental issues and provides task-specific training to those employees whose jobs are associated with significant environmental aspects.

Procedure

Awareness Training

1. All new employees receive a 15-minute introduction to the _____'s EMS, specifically its environmental policy, significant environmental aspects, and environmental objectives. This introduction, which includes an opportunity for the new employees to ask questions about the EMS, is given by the human resources (HR) manager as part of general orientation for new employees. The HR Department maintains records of employees who received this introduction.
2. Each year employees are invited to a company picnic. One of the scheduled events for this picnic is a 15-minute talk by a member of _____'s EMS implementation committee. This person speaks about the environmental accomplishments of the _____, the state of its EMS, and the goals for the coming year. These remarks provide an update to the initial EMS awareness training received by employees.

Task-Specific Training

3. Using the root cause analysis as a tool, the EMS committee, working in coordination with the appropriate operations managers, identifies the job functions that are associated significantly with each significant environmental aspect.
4. The EMS committee, in conjunction with the relevant operations manager, then determines what training employees performing each of these job functions should receive in order to control actual environmental impacts to the greatest possible extent.
5. Operations managers are responsible for ensuring that their employees receive the appropriate task-specific environmental training. Where possible, environmental training is integrated with other types of training (e.g., operational) that employees are receiving. The HR manager keeps records of the training received by each employee.

Frequency

Awareness training is given to new employees during their first week at _____. Task-specific training is given to relevant employees as they take on a new function that is associated with a significant environmental aspect. Task-specific training is updated, as necessary.

Records

Records of the awareness and task-specific training received by each employee are kept by the HR manager. The job functions associated with environmentally critical activities (i.e., those functions that should receive task-specific training) are listed on the Operational Controls Procedure.

Procedure for Emergency Preparedness and Response

Purpose

As part of its EMS, _____ strives to ensure that the environmental impacts associated with any emergency situations are minimized to the greatest extent possible.

Procedure

1. _____ has an Emergency Response Committee charged with identifying potential emergency scenarios and developing and ensuring the implementation of appropriate procedures, should an emergency situation develop.
2. With the assistance of the EMS coordinator, the Emergency Response Committee a) identifies the potential negative significant environmental impacts associated with potential emergency scenarios, b) incorporates measures to minimize these impacts into emergency response procedures, and c) ensures that adequate training (including simulations) is provided to appropriate _____ staff to implement these procedures.
3. The Emergency Response Committee maintains records of the potential emergency scenarios it is prepared for, the potential environmental impacts associated with each scenario, and the procedures established to minimize these impacts. The HR manager keeps records of training received by staff on implementation of emergency response procedures.

Frequency

The Emergency Response Committee meets quarterly to review the status of its work.

Records

Records of emergency scenarios, associated potential environmental impacts, and procedures to mitigate these impacts are kept by the Emergency Response Committee. Training records are kept by the HR manager.

Documentation and Document Control

Purpose

To ensure effective operation of the EMS, _____ documents the procedures of its EMS and keeps records of the outcomes of EMS processes, and of the important environmental issues facing the plant. This EMS manual comprises this documentation. Documentation is kept up-to-date.

Procedure

1. The EMS coordinator documents the procedures that define _____'s EMS in this manual. The EMS committee formally reviews and, if necessary, revises this manual on an annual basis. Revised manuals are assigned a new revision number (a minor set of revisions would change the number from, say, 1.1 to 1.2; a major revision would change the number from, say, 1.1 to 2.0). Finally, the EMS coordinator ensures that no employees or managers use outdated revisions of this manual.
2. The EMS coordinator maintains updated records of the following outcomes, or results, of the functioning of the EMS:
 - Environmental policy
 - Environmental aspects
 - Applicability of legal requirements to EAs); note that copies of the regulations themselves are maintained by the EMS management representative
 - Significant environmental aspects
 - Objectives, targets, and action plans for environmental management programs
 - Results of alternatives evaluations
 - List of operational control procedures related to significant environmental aspects
 - Results of internal assessments)
 - Corrective actions taken)
 - Management reviews

These items are described in more detail in the relevant procedures in this manual.

3. The EMS coordinator is not responsible for maintaining records of environmental training and emergency response preparations; the operational control procedures themselves; or the New Purchase Approval Forms, the Design Approval Forms, or the
4. Facility Expansion or Modification Plans. These records are maintained by the appropriate person or group, as specified in the relevant procedures of this manual.

Frequency

Manual review and revision on an annual basis.

Records:

Maintained as outlined in the procedure.

Procedure for Conducting a Compliance Assessment

Purpose

_____ conducts a periodic compliance assessment to ensure that it complies with all applicable local, state, and federal environmental regulations.

Procedure

1. The EMS management representative maintains copies of applicable legal regulations, which are summarized on the Applicable Legal Regulations Form. Based on these regulations, the EMS management representative and coordinator compile a list of questions as a compliance assessment protocol. These questions are intended to be sufficient to the compliance status of _____ with respect to applicable environmental regulations (both the paperwork and the performance-related components).
2. The EMS coordinator and another operations manager carry out the assessment by determining and recording the answers to the compliance assessment protocol. When they are done with the compliance assessment, they note any actual or potential compliance issues on the Compliance Tracking Log. Each actual and potential compliance issue is immediately referred to corrective action (see Procedure for Taking Corrective Action).

Frequency

Monthly

Records

Compliance assessment results are recorded by the internal assessment team using the compliance assessment protocol and using the Compliance Tracking Log. Records are maintained by the EMS coordinator.

Compliance Tracking Log

Person Responsible	Regulation	Root Cause	Compliance Check Date	Results	Date of Corrective Action	Date Compliance Verified

Procedure for Conducting an Internal Assessment

Purpose

_____ conducts periodic internal assessments of its EMS to ensure that it is being implemented and operated according to the procedures laid out in this manual.

Procedure

1. At intervals, a team of two or three operations managers or employees, who are not on the EMS committee, conducts an internal assessment of _____'s EMS. The assessment team uses this manual as the basis for its assessment. In particular, the assessment team checks to make sure that:
 - Each procedure is being carried out as stated in this manual
 - _____'s environmental policy is being upheld
 - Progress is being made in meeting the environmental objectives

The assessment team bases its evaluation on objective evidence, including documentation and records (e.g., those cited in this manual), interviews with key employees, and observations. Note that this is *not* a compliance audit.

2. The assessment team completes the checklist on the Internal Assessment Form and writes up its findings using the Internal Assessment Record. A “major non-conformity” occurs when an EMS procedure is clearly not being implemented, when one of the commitments in the policy is not being upheld, or when no progress is being made in achieving an environmental objective; a “minor nonconformity” occurs when a procedure is being implemented inconsistently, yet without causing major failings in the EMS as a whole.
3. Each non-conformity is immediately referred to corrective action (see Procedure for Taking Corrective Action).
4. Records of each assessment are maintained by the EMS coordinator.

Frequency

At least two times per year.

Records

Assessment results are recorded by the internal assessment team using the Internal Assessment Checklist and Internal Assessment Record. Records are maintained by the EMS coordinator.

Internal Assessment Checklist

Internal Assessment Team:

Date of Internal Assessment:

Signed: _____

EMS Procedures:

Check each item assessed (includes auditing of records, where applicable):

- ___ Environmental policy (adherence to policy commitments)
- ___ Environmental objectives (progress; implementation of action plans)
- ___ EMS responsibilities
- ___ Identification of Environmental Aspects
- ___ Identification of Legal Requirements
- ___ Identification of Significant Environmental Aspects
- ___ Development of Objectives, Targets, and Action Plans
- ___ Conducting an Alternatives Evaluation
- ___ Development of Operational Controls
- ___ Knowledge Skills and Training
- ___ Emergency Preparedness
- ___ Documentation
- ___ Conducting a Compliance Assessment
- ___ Conducting an Internal Assessment
- ___ Taking Corrective Action
- ___ Management Review

EMS Performance

- ___ Achieved objective #1
- ___ Achieved objective #2
- ___ Achieved objective #3

Contact Person: _____

Date Completed: _____

Internal Assessment Record

Internal Assessment Team	
Date of Internal Assessment	
Signed	
<i>Major Non-Conformities Observed</i>	
1.	
2.	
3.	
<i>Minor Non-Conformities Observed</i>	
1.	
2.	
3.	
Is _____ making progress in meeting its EMS objectives?	
Is _____ adhering to the commitments in its environmental policy?	
Suggestions for Improving the EMS	

Contact Person: _____

Date Completed: _____

Taking Corrective Action

Purpose

_____ uses a formal corrective action process to ensure that actual or potential compliance issues and EMS non-conformities are addressed quickly and effectively.

Procedure

1. The management representative assigns responsibility for taking action to correct each actual or potential compliance issue or non-conformity identified in a *compliance assessment* or an *internal assessment* to an appropriate manager or employee. Together they fill out the “Statement of the Problem” part of the Corrective Action Notice.
2. The person responsible then undertakes the corrective action required, calling upon the management representative, the EMS committee, and others for assistance as necessary.
3. The responsible person and the management representative fill out the “Completion of Corrective Action” part of the Corrective Action Notice when corrective action is complete.

Frequency

Whenever significant problems in the functioning of the EMS are identified, through the internal assessment..

Records

Corrective action is recorded using the Corrective Action Form; records are maintained by the EMS coordinator.

Corrective Action Form

<i>Statement of the Problem</i>
Date
Description of non-conformity or actual or potential compliance issue
Description of potential solution
Person responsible for corrective action
Deadline for completion of corrective action
<i>Completion of Corrective Action</i>
Actions taken
Results
Date

Signed: _____
Management Representative

Person Responsible

Procedure for Communicating with Stakeholders

Purpose

To ensure that interested external stakeholders receive appropriate information about the company's environmental activities, _____ has developed a company policy for considering and, where appropriate, responding to queries, comments, or complaints from stakeholders.

Procedure

1. The EMS committee identifies stakeholders and their potential interests in the environmental performance of _____. If the committee decides that *proactive* communication on environmental issues is necessary with any group, that decision is recorded and responsibility is designated.
2. When any form of communication is received regarding _____'s environmental performance or management from a stakeholder, that communication is immediately forwarded to the EMS management representative.
3. The EMS management representative considers the nature of the communication and makes a decision on whether and how to respond to it based on the guidance below. The EMS management representative is responsible for maintaining records of each such communication and response using the Stakeholder Communication Record. Where internal actions are necessary to address the communication, this is noted the Stakeholder Communication Record and a Corrective Action Form is initiated.

Guidance for Communicating with Stakeholders on Environmental Issues: _____'s environmental policy is available to all stakeholders upon request. _____ will do its best, however, to respond in kind to all good-faith communications from stakeholders about environmental issues, including complaints, comments, and information requests. However, _____ may not choose to respond in all cases, particularly if the request is made in bad faith or if sensitive information is requested.

Frequency

As per environmental communication.

Records

Records of environmental communications from stakeholders and _____'s responses are kept by the EMS management representative and are tracked. An updated version of the appropriate Stakeholders and Environmental Issues record, is kept in this manual.

Stakeholders and Environmental Issues Form

Stakeholder	Potential Environmental Interest	Proactive Communication Plan (if desired)	Person Responsible

Contact Person: _____

Date Completed: _____

Stakeholder Communication Record

<i>Date Communication Received</i>	
<i>Type of Communication</i>	
<i>Received From</i>	
<i>Address/Telephone Number/ E-Mail</i>	
<i>Content of Communication (attach copy if possible)</i>	
<i>Will _____ Respond?</i>	YES NO
<i>Date of Response</i>	
<i>Person Responding</i>	
<i>Position</i>	
<i>Nature of Response (attach copy if possible)</i>	
<i>Are Internal Actions Necessary?(If Yes, fill out a Corrective Action Form.)</i>	

Contact Person: _____

Date Completed: _____

Management Review

Purpose

To ensure the effectiveness of the EMS and its continual improvement, _____ top management periodically reviews the important elements and outcomes of the EMS.

Procedure

1. In preparation for the management review, the EMS management representative gathers the following information and makes it available to top plant management, including the owner and President of _____ and the plant manager:
 - Environmental policy
 - List of EMS committee and others responsible for major parts of the EMS.
 - List of significant environmental aspects and criteria of significance.
 - Update on compliance status of the plant and on any potential upcoming regulations that might require an advance strategy
 - List of environmental objectives and targets
 - Environmental performance results (from monitoring and measuring SEA indicators and indicators of progress toward environmental objectives and targets)
 - Bullet-point description of other accomplishments of the EMS (e.g., number of people trained, etc.)
 - Results of most recent EMS internal assessment, compliance assessment, and corrective actions taken
 - Description and documentation of feedback from stakeholders (if received)
 - Analysis of the costs and benefits of the EMS (as quantitative as possible)
2. Top plant management meets to review and discuss the information presented. The EMS management representative and coordinator will also be present. Depending on its review, top management may direct specific and/or significant changes in the scale and direction of the EMS in order to improve its effectiveness and business value. The conclusions and directives that result from the management review are recorded and kept by the EMS coordinator.

Frequency

Quarterly.

Records

Results of management reviews are recorded. Records are kept by the EMS coordinator.

Management Review Record

Date of review meeting	
Persons present at meeting	
Name	Position
Conclusions	
Actions to be taken	Person(s) responsible

Signed: _____
Management Representative

Plant Manager

APPENDIX E

DETAILS on OTHER ENVIRONMENTAL MANAGEMENT SYSTEM FRAMEWORKS

ISO 14001

Summary Description

ISO 14001 is an international standard for environmental management systems. Of the environmental management frameworks, ISO 14001 is probably the most familiar. Some companies adopt this framework because their customers require it because their parent company requires it, or to improve international competitiveness (by breaking down international trade barriers) as a result of certification to the ISO 14001 standard. In addition, other states have used the ISO 14001 model as the basis for developing their own EMS and environmental performance recognition programs.

ISO 14001 generally requires:

- Environmental Policy
- Planning
 - Environmental Aspects
 - Legal and Other Requirements
 - Objectives and Targets
 - Environmental Management Programs
- Implementation and Operation
 - Structure and Responsibility
 - Training, Awareness, and Competence
 - Communication
 - Environmental Management Systems Documentation
 - Document Control
 - Operational Control
 - Emergency Preparedness and Response
- Checking and Corrective Action
 - Monitoring and Measurement
 - Nonconformance, Corrective, and Preventive Action
 - Records
 - Environmental Management System Audit
- Management Review

The Massachusetts Model closely mirrors the ISO 14001 standard.

How ISO 14001 Differs from the Massachusetts EMS Approach

Pollution Prevention

The Massachusetts EMS Approach emphasizes source reduction within each environmental aspect. Source reduction means taking steps to prevent the creation of waste in the first place and to prevent the transfer of waste and/or risk from one media to another (e.g. water to air, or air to worker health and safety). The emphasis on source reduction is designed to make the Massachusetts EMS consistent with the techniques described in the Toxics Use Reduction Act for the prevention of waste:

- Input substitution or product reformulation
- Process redesign or modification;
- Process modernization;
- Improved operation and maintenance; and
- Recycling, reuse, or extended use of the material.

The ISO 14001 model takes a broader definition of pollution prevention to include treatment of waste and other techniques to minimize risk to the environment.

Public Participation

The ISO 14001 model does not require the facility's EMS to include public reporting; however, inquiries made by the public of the facility's operations should be addressed within the facility's communications programs. Like the ISO 14001 model, the Massachusetts EMS Approach encourages facilities to have a mechanism for responding to external inquiries concerning the facility's EMS as part of the communication program, but also encourages two-way public participation. In addition, the Massachusetts Environmental Stewardship Program requires that an applicant show that it is committed to public outreach through established mechanisms for identifying and responding to local concerns regarding the environmental effects of its operations. The applicant must show that it is committed to informing the public and stakeholders about its environmental improvement activities.

RESPONSIBLE CARE®

Summary Description

Responsible Care® originated in Canada in 1988 as a means of communicating with the public about chemical manufacture and use. The American Chemistry Council now requires all member companies to adopt the Responsible Care® code. Responsible Care® is based on 10 elements:

Guiding Principles: the policy that frames the entire Responsible Care® program.

Codes of Management Practices: six individual sets of standards pertaining to facility operations. The standards within each code of management practice are intended to support one another and ensure that facilities are able to operate in accordance with the Guiding Principles.

Dialog with the Public: facilities use community advisory panels to address public concerns with stakeholders.

Self-Evaluations: members submit annual progress reports on implementation of each of the Codes.

Measures of Performance: each code has a set of performance measures by which facilities can gauge progress.

Performance Goals: facility-specific or company-specific goals to measure progress; annual public reporting.

Management Systems Verification: facilities receive an independent review of their system for effectiveness.

Mutual Assistance: an information-sharing feature of Responsible Care® program. Companies share best practices through a network, typically through the state trade association.

Partnership Program: allows chemical-industry companies that are not members of the American Chemistry Council to participate directly in Responsible Care®.

Obligation of Membership: members are required to commit to the Guiding Principles of Responsible Care® and make a good faith effort to implement program elements.

Guiding Principles

The Responsible Care® Guiding Principles are essentially an environmental policy for the program. Companies that subscribe to Responsible Care® may have their own environmental policy, but if they belong to the American Chemistry Council, they also commit to adhering to the Guiding Principles.

The Guiding Principles include commitments to:

- Include public input in products and operations;
- Incorporate environment, health, safety and resource conservation into the new products and processes;
- Support research and educate workers and stakeholders on environmental, health, and safety risks and provide protective measures;
- Support safe chemical use, transport, and disposal in the chemical supply chain; and
- Take a leadership role in developing laws, regulations and standards to safeguard the facility, the community, and the environment.

Codes of Management Practices

Facilities commit to following six codes of Management Practices, which are:

- Community Awareness and Emergency Response (CAER) Code;

- Pollution Prevention Code;
- Process Safety Code;
- Distribution Code;
- Employee Health and Safety Code; and
- Product Stewardship Code.

The Codes of Management Practice is the heart of Responsible Care® and in essence, forms a management system for the facility. Each of the Codes of Practice address one or more of the critical elements contained in the MA EMS Approach; several address the “Beyond compliance” attributes associated with a Stewardship-level EMS. Other Responsible Care® program details are available at <http://www.americanchemistry.com/>.

How Responsible Care Differs from the MA EMS Approach

The Codes of Management Practices contained within the Responsible Care® model contain all of the elements of the MA EMS Approach. A facility that is dutifully meeting the Codes of Management Practices should be substantially in compliance with environmental regulations and should be able to demonstrate steps it has taken to evaluate and practice source reduction activities.

A facility that has adopted the Responsible Care® model and wishes to apply for the Massachusetts Environmental Stewardship Program should ensure that its EMS addresses the use of any TURA-listed chemicals, including higher hazard chemicals not used in reportable quantities.

MASSACHUSETTS ENVIRONMENTAL RESULTS PROGRAM (ERP)

Summary Description

The Massachusetts Environmental Results Program (ERP) is an on-going environmental performance enhancement and measurement initiative that seeks to cost-effectively improve the environmental performance of certain small business sectors. In this regulatory system, small businesses are educated about their environmental impact and obligations, are required to self-evaluate and certify compliance, and are tracked to measure environmental performance changes. ERP applies a generic EMS-like approach for small businesses with single unit operations. General health and safety, best management practices, and both voluntary and mandatory pollution prevention are incorporated into the Program and reviewed by the facility on an annual basis. Currently, frameworks exist for photoprocessors, dry cleaners, printers, and new boiler installations. The ERP Program replaces certain permits issued by the Department of Environmental Protection with a self-certification statement. ERP covers:

- Planning
 - Aspects and impacts are addressed as certification statement questions
 - ERP manuals typically include pollution prevention information related to the process
- Training, Awareness, and Competence (to a limited degree, based on the ERP sector)
- Operational controls (typically performance standards cited in the manual and certification statement)
- Documentation (facilities advised to keep a copy of the manual on site as well as monitoring records)
- Document Control (limited --- retention time for monitoring records)
- Emergency Preparedness and Response
- Monitoring and Measurement
- Non-conformance and corrective action (i.e. Return to Compliance Plans are submitted to DEP)
- Records (facilities are required to maintain logs of monitoring and measuring activities)
- Reporting (to DEP)
- Management review (i.e. the certification statement must be signed by an authority in the facility)

How ERP Differs from the MA EMS Approach

ERP is not intended to be a formal EMS system, however a company that is currently certifying under ERP can use the program as a starting point for developing an EMS since it has many elements and attributes that are similar to the MA EMS Approach.

ERP is a compliance-based framework, and represents the “minimum” that a company would need to do to be in compliance. While ERP has many elements and attributes that are similar to the MA EMS Approach, there are some substantial differences.

Major differences from the MA EMS approach include:

- ERP does not establish an environmental policy for the facility; companies only certify compliance.
- The Planning element is limited. Specifically:
 - Aspects and impacts identification is limited to DEP regulations for that sector.
 - Minimal attention is given to worker health and safety as it applies to chemical use and management.
 - The facility is not required to set objectives and targets beyond those required for ERP.
 - ERP has some P2 components, but it is not a program that emphasizes source reduction. However, as a result of certifying under ERP, some facilities have pursued source reduction.
- Implementation is limited to what is regulated under DEP. In turn:
 - Stakeholder involvement is limited to supplier relationships and DEP or the local sewer authority.
 - EMS functions and responsibilities are not required.
 - Monitoring, Measurement, and Corrective and Preventive Action

- ERP provides for compliance checklists, but there is no system-wide audit or root cause analysis.

A company that is currently certifying under ERP can use the program as a starting point for developing an EMS. On its own, however, a facility cannot use ERP certification as a substitute for an EMS, and will need to develop those elements and attributes described above.

TOXICS USE REDUCTION (TUR) PLANNING

Summary Description

In 1989, Massachusetts Legislature passed the Toxics Use Reduction Act, or TURA. The regulation calls for facilities to report on chemical use and generate plans for reducing their use if these conditions are met:

- Facility is in SIC Codes 10-14, 20-40, 44-51, 72, 73, 75, or 76;
- Facility has 10 or more full-time employees (or meets an equivalent of 20,000 work hours per year); and
- The facility manufactures or processes 25,000 lbs. or otherwise uses 10,000 lbs. of a listed chemical [although lower thresholds have been established for persistent, bioaccumulative, and toxic (PBT) chemicals].

A TUR Plan is required for each chemical reported beyond one year. The TUR planning framework includes:

Management Policy

Scope of TUR Plan

Employee Notification (six months before plan due date) and Involvement

- Plan Requirements
- Identify the toxic chemicals and production units included in the plan
- Make available the requirements and criteria for the plan; and
- Solicit comments and suggestions from employees on toxics use reduction options.

Cross-functional planning team

Process characterization

- Purpose of chemical in process
- Process Flow Diagrams

- Materials Accounting
 - Level of Precision
 - Standard Engineering and Monitoring Practices for Calculation
 - Determine Production Unit and Unit of Product

Procedure to identify TUR options

- Personnel involved
- Description of information sources consulted
- Description of information gathering techniques
- List of technologies, procedures or training programs identified.

Evaluate TUR Options

- Technical (environmental and health and safety issues)
- Economic

Options to Implement

- Options Dropped
- Options requiring additional research

Project reduction (byproduct and emissions)***Implementation schedule******Develop Plan Summary***

- The certification statement by the TUR Planner.
- Projected facility-wide changes in the total quantities of each listed toxic chemical used and generated as byproduct between the year on which the plan is based and a 2-years and 5-year horizon.
- Projected byproduct reduction index (BRI) for 2 and 5 years.
- The types of TUR techniques (indicated by number on the TUR matrix from the annual report) to be implemented on each production unit/chemical combination
- Any other information the company believes would be beneficial for DEP or the public to review, such as the scope of the plan.

The plan is certified by from a management official at the facility and a DEP-authorized Toxics Use Reduction Planner. The TUR Plan remains on-site; a Plan Summary is submitted to DEP and provides an overview of the chemical, production unit, TUR project, and proposed reduction target.

A Plan Update must be submitted every two years from the date the initial plan is due. The Plan Update is essentially the “continuous improvement” component of the TUR Plan.

How TUR Planning Differs from the MA EMS Approach

While TUR Planning is not intended to be a formal EMS, a facility that currently engages in TUR Planning currently meets all of the critical elements and many of the attributes in the MA EMS approach, if the EMS fenceline is the production unit. TUR Plans call for securing the financial resources for implementing feasible options, and internal communication programs are required for the purposes of employee notifications and soliciting input from employees. Stakeholder involvement is implied through the employee component and methods for obtaining information on TUR options. TUR Planning provides a good starting point for developing an EMS. In moving from TUR Planning to an EMS areas that would need to be addressed include development of a system for maintaining currency on regulations and codes of practice, corrective action, and audits.

EPA PERFORMANCE TRACK PROGRAM

Summary Description

EPA's Performance Track program (formerly Star Track) is designed to reward those companies that have demonstrated environmental performance by implementing an EMS. The program is open to large and small business, as well as state and federal agencies that have completed at least one full cycle of plan-do-check-act.

A facility that wishes to enroll in Performance Track must apply to EPA and undergo a compliance screen and review of environmental performance data based on the EMS. The EMS approach highlighted in Performance Track loosely follows ISO 14001 and aligns well with the MA EMS Approach. Facilities must have:

Environmental policy that commits facility to:

- Compliance with legal requirements and voluntary [commitments]
- Pollution prevention
- Continuous improvement in environmental performance for regulated and unregulated activities
- Sharing information on EMS performance with the community/stakeholders

Planning

- Identification of environmental aspects, legal requirements, and procedures for integrating expected changes to facility requirements
- Identify measurable objectives and targets to meet commitments outlined in environmental policy; focus should be on pollution prevention, preventing non-compliance, and improving environmental performance
- Documented programs, "including the means and timeframes for their completion".

Implementation and Operation

- Establish roles and responsibilities, and designate a senior official who will take responsibility for the EMS
- Define procedures for:
 - Achieving and maintaining compliance and meeting objectives
 - Intra-facility communication on the EMS, including performance

- Providing incentives for personnel to fulfill their part in the EMS
- Document control
- Training
- Documentation of key EMS elements
- Operation and maintenance programs for equipment and processes that are related to compliance requirements or environmental aspects.
- Emergency preparedness

Checking and Corrective Action

- Establish compliance audit program and EMS audit program to prevent and detect non-conformances
- Establish program for correcting non-conformances

Management Review

- “Documented management review of performance against the established objectives and targets and the effectiveness of the EMS in meeting policy commitments.”

Once accepted into the program, facilities must submit an annual performance report. The report format is based on the Global Reporting Initiative and is made publicly available.

How Performance Track Differs from the MA EMS Approach

The main difference that exists between the Performance Track model and the MA EMS approach is that the MA EMS approach encourages facilities to address worker and health and safety as it applies to chemical use

Facilities that are Performance Track members, or have adopted the Performance Track model may need to address some additional issues if they wish to apply to the MA Environmental Stewardship Program..

CLEAN STATE INITIATIVE/STATE SUSTAINABILITY EXECUTIVE ORDER***Summary Description***

In 1993, Governor Weld issued Executive Order 350, establishing the Clean State Initiative. E.O. 350 mandated that state agencies comply with all state environmental regulations by June 30, 2000. Authorities and Colleges, though not required to meet the condition, were encouraged to participate. Agencies had access to consultants and technical assistance programs to conduct environmental compliance assessments. Top down commitment was expressed in over \$15 million authorized by the Former Governor and the Executive Office of Administration and Finance for environmental projects designed to bring state facilities and state-owned properties into compliance.

In addition, E.O. 350 also called for agencies to employ "preventive environmental measures and regulatory changes to ensure that the Commonwealth itself is engaged in environmentally sound practices." EMS was envisioned as the strategy for ensuring future environmental compliance, along with annual fiscal support (that is, budget allowances) for waste removal, equipment restock, and infrastructure maintenance.

The Clean State Initiative featured:

- Policy
- Planning
 - Secure financial and human resources
 - Environmental compliance assessments
 - Pollution prevention and waste minimization planning
- Implementation
 - Roles and Responsibilities
 - Standard Operating Procedures
 - Emergency Preparedness and Prevention
- Monitoring, Measurement, and Corrective and Preventive Action
 - Regular audits
 - Corrective Actions
 - Sharing lessons learned
- Management Review
 - Formal review of results and secure continued financial resources

On July 23, 2002, Governor Swift continued the legacy of the Clean State Initiative with Executive Order 438, State Sustainability Program. The purpose of the State Sustainability Program is to bring state agencies and facilities beyond compliance, and serve as an environmental performance model for other organizations. The State Sustainability Program provides a menu of options from which agencies can choose to pursue their beyond compliance efforts; EMS is one of the options.

The State Sustainability Program Executive Order calls for the following EMS activities:

- Develop baseline data on agency environmental impacts and examine existing operations, procedures and requirements;
- Set priorities, objectives and targets;
- Demonstrate management support for sustainability efforts;
- Establish staff responsibilities, provide training, and institute accountability mechanisms;
- Develop action plans and procedures;
- Track and measure progress;
- Establish mechanisms for feedback and review; and
- Plan for continual improvement.

The Order specifically recommends EMS development and implementation for those agencies with multiple facilities and multiple environmental impacts. Two major milestones are also established, which are:

- Within one year of the signing of the order, all state agencies are required to begin processes to review internal operations, identify environmental impacts, make recommendations for reducing those impacts, and establish short-term objectives and long range vision of sustainability
- Within two years of the first meeting of the State Sustainability Council, agencies must submit a written plan that addresses the EMS activities identified above.

Finally, the Order calls for agencies to review and update their plans periodically, but at least on an annual basis.

How the Clean State Initiative/State Sustainability Program Differ from the MA EMS Approach

- Although it was not intended to be a formal EMS, the Clean State Initiative sets some initial groundwork for an EMS and agencies could use the MA EMS Guidance to build upon their efforts. Main differences include:
- Clean State is limited to state environmental regulations, and does not call for facilities to develop a system for staying current on laws, regulations, and good management practices;
- Facilities are not required to set performance goals beyond complying with the law;
- Milestones and timelines are not indicated;
- Focus on compliance assessments; no mention of process mapping or evaluation, materials accounting or other planning tools;
- Clean State does not appear to mention worker health and safety issues, only environmental impacts;
- Stakeholder programs and communication programs are not discussed beyond the facility's interaction with state regulatory agencies; and
- Document control and record keeping are not discussed within the Clean State framework.

The State Sustainability EMS framework addresses many of these issues, however it does not discuss:

- Process mapping;
- Worker health and safety;
- Stakeholder programs and communication programs; and
- Document control and record keeping.

DEP COMPLIANCE-BASED EMS

Summary Description

In January 2001, the Massachusetts Department of Environmental Protection published “Guidance on Incorporating Environmental Management Systems into Enforcement Negotiations and Settlements”. This guidance identifies key elements of a compliance-focused EMS that a facility should implement to achieve and maintain compliance with environmental regulations. The full text of DEP’s enforcement policy regarding EMS is contained in Appendix A. The key elements of DEP’s compliance-based EMS are as follows:

1. Environmental compliance policies, procedures and guidance documents for all of the organization’s operations and activities;
2. Clearly specified organizational responsibilities and accountability of organization’s staff and management, on-site service providers, and contractors for regulatory compliance, required reporting to regulatory agencies, and corrective actions implemented in their area(s) of responsibility;
3. A system for tracking compliance activities;
4. Schedules and a system for conducting regular inspections of operations and facilities and annual self-audits of operations and facilities for the purposes of preventing and controlling releases, ensuring environmental protection, and maintaining compliance with statutory and regulatory requirements;
5. A system for ensuring that routine requirements for sampling, monitoring, and reporting data required by law, regulation and permit are accomplished;
6. Standard procedures and requirements for incident and noncompliance reporting to regulatory agencies, including requirements to report releases of oil and/or hazardous materials and implementation of measures to minimize risks from such releases;
7. A system for establishing return to compliance plans for noncompliance identified during inspections and audits;
8. A system for the development of continuous improvement goals and results reporting that may include: recycling and the purchase of recycled products; pollution prevention; source reduction; resource conservation; energy consumption; waste minimization, renewable energy and renewable technologies;

9. Annual compliance training for management and personnel, and initiation training for new management and personnel;
10. A process for an objective annual review and evaluation of the EMS and its components, including: implementation of modifications as necessary to ensure timely compliance and a commitment to continual improvement, and senior management review to ensure that goals are being achieved;
11. Program for ongoing community outreach in the environmental aspects of regulated entity's operations and general environmental awareness.

In addition, the EMS should describe how these key elements will be integrated into the organization's overall decision making and planning, and in particular, decisions on capital improvements, product and process design, training programs and maintenance activities.

As part of a consent order in which a facility agrees to develop an EMS, DEP may require the facility to submit written reports on EMS to:

- Report on progress in developing an EMS, or modifying an existing EMS;
- Describe the final EMS and a plan for implementing it;
- Verify that the final EMS is implemented through
 - An independent qualified EMS auditor; or
 - Self-certification by an officer or manager within the regulated entity with the authority to spend money and assign staff.
- Detail the extent to which the EMS continues to be implemented and effective.

How the DEP Compliance-Based EMS Differs from the MA EMS Approach

- The DEP compliance-based EMS is designed to ensure sustained compliance with environmental regulations, but also encourages the development of continuous improvement goals and results, such as pollution prevention. While focused on compliance, the EMS serves as a starting point for further enhancing environmental performance through adoption of the components of the MA EMS Approach. Although the general concept of plan-do-check-act is apparent, some major differences exist. They are:
- Attention to worker health and safety issues are not addressed, unless they are DEP requirements;
- Source reduction is not emphasized, although it is mentioned as a continuous improvement goal;
- Reporting on results may be required, but performance metrics is not specifically mentioned;
- Stakeholder involvement is limited to DEP or other emergency response authorities;
- "Implementation of measures to minimize risks of releases" does not provide a clear requirement for root cause analysis as part of corrective and preventive action; and
- No "stewardship-level" EMS attributes are included in the model.

SUPPLEMENT 1

EMS FOR GOVERNMENT AGENCIES: MASSACHUSETTS STATE SUSTAINABILITY PROGRAM

With tens of thousands of employees, over one-thousand buildings, hundreds of facilities, and activities that generate solid waste, toxics, air emissions, greenhouse gases, and consume vast quantities of materials, energy and water, Massachusetts state government has the potential to make a significant impact on the local environment. Additionally, by taking a lead on environmental protection, resource conservation and by focusing on a sustainability framework, Massachusetts can establish a model that can be emulated by other public entities, as well as private corporations.

The State Sustainability Program

The State Sustainability Program was established in the Spring of 2001 as a part of the growing recognition that the state should take a more holistic approach to environmental issues and that examining elements outside regulatory control, such as, energy consumption, waste generation, and persistent bioaccumulative toxins we are taking relevant next steps toward true environmental stewardship.

Program Areas

While Sustainability encompasses a wide range of environmental issues, the State Sustainability Program will, at least at its inception, and following approval by the Coordinating Council and Advisory Committee, focus on the following program areas:

- Environmental Management Systems
- Waste Prevention & Recycling
- Energy Efficiency
- Greenhouse Gas Reductions
- Water Conservation
- Sustainable Design
- Alternative Fuel Vehicles and Transportation
- Environmentally Preferable Purchasing
- Toxics Use Reduction
- Resource Conservation

State Sustainability Goals

In working toward sustainability, Massachusetts state government will begin to implement strategies to support the realization of the following statewide goals:

- A 25% reduction in greenhouse gas emissions by the year 2012 through efforts such as building energy efficiency and conservation, purchase and utilization of alternative fuel and fuel efficient vehicles, use of renewable energy and innovative technologies, in accordance with the Massachusetts commitment to the New England Governors/Eastern Canadian Premiers 2001 Climate Change Action Plan. Such efforts shall include the development of a greenhouse gas inventory based on FY 2002 baselines;

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- A 50% recycling and composting rate by 2010, and a reduction in the overall amount of waste generation through implementation of comprehensive source reduction and recycling programs, in accordance with the Massachusetts Beyond 2000 Solid Waste Master Plan; and,
 - Removal of mercury from agency waste streams through the elimination of the purchase and use of mercury and mercury added products (where environmentally preferable alternatives exist) by 2005, and the immediate implementation of recycling programs for of all mercury containing products, including, but not limited to, batteries, thermometers, and fluorescent lamps. When recycling is not feasible, all mercury containing products must be disposed of properly. All such efforts shall be consistent with the 1998 New England Governors/Eastern Canadian Premiers Regional Mercury Action Plan and the Massachusetts Mercury Elimination Strategy.

Additionally, to the extent feasible, state agencies will implement programs and policies that:

- Reduce energy consumption through energy efficiency and conservation, and promotion of changes in employee practices;
- Significantly reduce the use of highly toxic persistent bio-accumulative toxins and other toxic materials, or products which contain these materials, through initiation of pollution prevention and other efforts;
- Decrease water consumption through conservation, efficiency and prevention strategies;
- Increase the purchase and use of environmentally preferable products and services, and innovative technologies that reduce state government's environmental and health impacts;
- Incorporate sustainable building design and construction principles to reduce energy and water consumption, minimize waste and toxic materials, utilize materials that promote resource conservation and improve indoor air quality, and promote safe, productive, and healthy environs for building occupants, visitors, and others; and
- Are consistent with regulations and guidelines governing natural resource conservation, protection of open space, habitat protection and restoration, and preservation of natural biodiversity.

Environmental Management Systems

For agencies with multiple facilities and multiple environmental impacts, an EMS is considered to be the most appropriate method of establishing agency-wide procedures to meet the goals of State Sustainability. EMSs have been used successfully to minimize the ecological footprint of organizations, while reducing operating costs and improving efficiency. The structured approach of an EMS is an effective method of developing and implementing sustainability program goals, policies, roles and responsibilities, lines of communication, internal review processes, and training procedures.

SUPPLEMENT 2

USING OUTSIDE SERVICES

Once top management at your facility agrees to develop and implement an EMS, you are ready to begin. Typically, the first step in developing an EMS is to conduct an initial assessment of the organization, known as a “gap analysis.” The gap analysis identifies the current management elements and those elements that need to be modified or developed, and should be documented and presented to management. Once completed, it serves as a roadmap for the EMS development and is updated as progress is made. The gap analysis is performed by a team of company staff dedicated to developing the EMS, and may include experts from outside of the organization (i.e., “facilitators”). However, the “facilitator” may be someone from within the organization.

An organization’s EMS team should include the best candidates¹ selected from various departments/areas of the organization. For companies this would include such areas as purchasing, maintenance, information management, legal, production, and others as appropriate. The facilitator should provide the team instruction on the principles of the EMS structure and training as needed. With the team, the facilitator should also be responsible for developing a preliminary action plan detailing the steps necessary for establishing an EMS. This plan should identify the necessary procedures, specify activities needed to address existing issues, target and prioritize issues, and identify steps necessary to prevent potential issues.

The facilitator must have the skills to engage the entire staff with the implementation of the EMS, and the authority to direct their actions. This includes the formation of an EMS team as well as assigning implementation responsibilities where needed. Facilitators are expected to help answer questions and guide the process throughout the entire project.

Implementation of an EMS will likely involve some shift in the organization’s management culture, priorities, and procedures. The facilitator serves the important role of providing guidance to the organization’s EMS team on effective implementation procedures. Once trained, the EMS team members become the in-house trainers for the rest of the organization’s staff. The facilitator continues to mentor these trainers throughout the process and recommend educational tools as appropriate. Training should be modeled from the gap analysis and encompass all elements that involve an addition or change to existing operating procedures. Schedules for initial training and training refreshers should be established, with priority given to the most crucial issues.

¹ While there is no definition of “best candidates”, our guidance is to choose people who are directly involved in the various day to day operations of your facility. This allows for feedback on procedures as they are being developed, and instills a reality check that is important relative to the continued support of the system by your facility’s staff. Finally, the candidates chosen act as stewards within your operation, supporting and promoting the implementation and sustainability of your EMS.

Choosing Facilitator Services

If your facility is fortunate enough to already have staff that are experienced with developing management systems (quality or environmental) you know that maintaining the qualifications of your EMS champion/facilitator is essential. Refer to Section 2.3.3 for guidance on maintaining competency of your EMS personnel. However, if your facility is like many others, you may need the services of a professional to assist you with EMS development and implementation.

An EMS is tailored to meet the individual needs of the firm that it is developed for; there is no “one-size fits all.” Some can be done entirely in-house while others require special expertise from outside contractors. By understanding your EMS needs and the qualities to look for in an EMS facilitator, you will be able to make more informed and cost-effective decisions.

When selecting an EMS facilitator, begin by contacting at least three contractors that are recommended by others, either from personal experience, or from professional organizations such as the American Society for Quality (ASQ). In general, look for facilitators that have experience with implementing EMS and, if possible, familiar with your type of business. Although your firm may not decide to become ISO 9001 or 14001 certified, find out if the facilitator has experience in bringing companies into ISO certification – typically after the basic EMS is in place, firms then decide to continue on to become certified. It is also important to ask potential facilitators to provide you with references from former clients and, if applicable, current clients.

Another step in successfully selecting an EMS facilitator is to have a request for contract proposals that clearly defines your EMS needs and facilitator requirements. If your company is hiring an EMS facilitator for the first time, you may want to utilize the template provided below to assist you in developing a request for contract proposals. Keep in mind that when reviewing proposals, you should verify the information provided, including the length of EMS implementation (usually a minimum of 6-12 months) and the experience of the actual project staff.

Example: Template for Requesting EMS Contract Proposals

Background

This is a request for contractor assistance with an effort by XYZ Co. to establish an Environmental Management System (EMS) that will aid in the identification, addressing, and prevention of environmental, health and safety (EHS) problems. The EMS should be of a caliber that will provide an opportunity for XYZ to continue on to certification in ISO 14001 should it so desire.

Overview

XYZ has determined that an EMS would be beneficial in maintaining its environmental operations and programs. The objective of implementing the EMS is to improve the EHS-related operations so that they function in a fashion that is in compliance with regulations and good management practices. XYZ desires a management system that completely integrates environmental considerations into an organization culture and procedures (so they become “second nature”). The contractor will receive the full support of management in this endeavor.

Gap Analysis

It is expected that a gap analysis will be performed to determine the status of the current management system relative to what is in place, identify what is in need of improvement and what needs to be initiated. The results of the analysis will be documented and formally presented to management. The gap analysis must be structured such that it can be updated.

EMS Team

Upon completion of the gap analysis the contractor will act as an advisor/facilitator and assist in the formation and training of an EMS steering committee (“team”). The team will consist of representatives from various departments/areas of the company such as purchasing, maintenance, information management, legal, production and others as appropriate. The contractor will provide instruction on the principals of EMS organization and operation, and training on the various aspects of successful EMS implementation. The contractor will be responsible for developing with the team a preliminary action plan that details the prioritization of issues and specification of necessary steps based on these issues. Necessary steps should include the establishment of practices that prevent or minimize the potential for certain liabilities.

Training

The contractor will be responsible for providing guidance on implementing EMS procedures by training team members to serve as trainers, mentoring training sessions, and recommending educational tools. The training will encompass all areas identified by the gap analysis as lacking direction, needing reinforcement, and requiring closer attention. Areas where initial training, retraining, and refresher training are required will be identified and prioritized.

EMS Implementation

The contractor will assist XYZ in the initiation of the EMS by providing guidance that will engage all employees in EMS awareness. Such engagement could include formation of an implementation committee, quality improvement teams, and assigning implementation responsibilities. Availability by the contractor to respond to questions and situations is expected throughout the project.

Completion

The contractor will provide a projected completion date with interim milestones. Payment to the contractor will be based on successful attainment of these milestones.

(At this point XYZ Company should include their standard procurement procedures and requirements.)

